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Original Communications

THE SIGNIFICANCE AND IMPORTANCE OF PERIODIC MEDICAL EXAMINATIONS.*

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I welcome the opportunity to discuss with you this evening the subject of periodic medical examinations. A good deal, as you know, is at present being written and said upon this theme. Just last week a conference of the secretaries of all the State medical societies and the Board of Trustees of the American Medical Association was held for the study and promotion of such examinations through the county and State medical societies. The medical profession generally appears to be very much in earnest about this matter and as I shall attempt to indicate hereafter, this proposal, though still recent in origin, has passed from an academic to a practical stage.

The movement is significant from the standpoint of preventive medicine because it emphasizes the importance of the individual assuming a larger share of responsibility for his own health through utilizing the services of his physician for health promotion as well as for disease prevention. Simple as such a proposal may appear, it marks, as I see it, a somewhat new tendency in health work. Those of us who have been primarily concerned with the problem of public hygiene and preventive medicine as developed during the past few decades realize that our scientific resources have been pretty largely though not exclusively devoted toward protecting man from external agents—from parasitic diseases, which so far as the individual is concerned were largely fortuitous, and from unwholesome and morbid environmental factors and influences. While we have been thus engaged we have not seriously interfered with man's personal outlook on health and disease which remains pathetically archaic in spite of the remarkable advances in medical knowledge. "Keeping the doctor away" is to the average man still a measure of fitness, and there are yet too many people who regard the physician as a "man of mystery" to be sought only as a last resort. I confidently believe, as the practice of periodic medical examinations becomes more and more universal, that this medieval attitude will undergo a complete change and that the physician will come to be recognized more and more as a "health counsellor."

As medical men, we recognize more fully than ever before that we cannot come anywhere near our potentialities in preventive medicine and health promotion until every individual, in a conscious, deliberate and personal sense seeks to avoid unhygienic, health destroying practices which lead to functional disharmony, to degenerative changes, and to morbid processes, and undertakes in a positive sort of way the attainment and maintenance of health and bodily harmony. I shall not insist that such an Utopia can be achieved through so simple a procedure as periodic medical examinations. That the application of this procedure on as universal a scale as possible is a step in the right direction no one can seriously deny. Health examinations cannot be dismissed as a passing fad for the efforts already undertaken by reputable medical and health organizations to give them a conspicuous place in our health programs is assurance enough of their significance and importance.

One of the earliest presentations of this subject in a formal way was at the annual meeting of the American Medical Association in 1900. Doctor George M. Gould, of Philadelphia, in addressing the Association at that time, anticipated the significance and importance of this movement when he said:

"All good medicine inevitably tends to become preventive medicine; all good physicians labor to stop disease before it arrives. The whole ingenuity of the trained diagnostician is now expended on the problem of the earlier

*Address delivered before the Seaboard Medical Association of Virginia and North Carolina, at Norfolk, Va., December 1-3, 1925.

symptom. He is the greatest discoverer who finds the presymptom, or the symptom of the symptom; the greatest therapeutist is he who cures before the disease exists, he who starves the bacillus to death, he who stops the evil habit, thus preventing the malfunction that becomes organic disease."

In 1910, additional light was thrown upon the subject by Irving Fisher's well-known study, "National Vitality—Its Wastes and Conservation." His report states: "We must conclude that at all times in the United States about 3,000,000 persons are seriously ill." He estimated that fully half this illness was preventable.

Among the first organizations to undertake periodic medical examinations were some of the larger insurance companies who offered this service to their policyholders. An interesting report from one of these companies has just made its appearance in the *American Journal of the Medical Sciences* (October, 1925, p. 576.) The principal findings relative to the physical condition of more than 16,000 men (which apart from the draft examinations constitutes one of the largest groups examined in recent years) are given in tabular form. "It is entirely credible," states the report, "that the facts shown for this group of more than 16,000 males are indicative of conditions in the general population of white males. If so, it is clear that a wider extension of periodical health examinations among the adult population is indicated. Hygienic advice and the prompt treatment of both major and minor defects thus discovered may lead to the prevention of serious consequences to those individuals later on. Most of the defects and impairments discovered in the younger ages of adult life are subject to effective control." What gave our complacent attitude toward health values the greatest jolt, however, was the appalling wartime disclosures of defects, abnormalities and disabilities among recruits. What made these revelations especially disconcerting was the fact that the men examined were presumably well and in an age group where optimum vitality was to be expected.

The cumulative force of these various revelations of our physical poverty led such organizations as the American Medical Association and the American Public Health Association to take cognizance of the problem and to project a definite program of action. In 1922, the American Medical Association went on record urging county medical societies to make public declaration that their members are prepared and ready to conduct such examinations, it being understood that the indigent only shall be examined free of charge and that all others are expected to pay for such examinations. This stand has been reiterated at every subsequent meeting of the Association. Particularly impressive was the resolution presented by the Committee on Hygiene and Public Health at the Chicago meeting in 1924, which reads as follows:

Whereas, Periodic medical examinations of all the people from birth to death are of great importance in the promotion of health; therefore, be it

Resolved, That state and county medical societies be urged to endorse as a part of the health program of organized medicine the making of these examinations:

That the members of the respective societies be requested to make such examinations in the homes or in their offices, free to any persons who, by reason of economic conditions, require such favorable consideration, and

That in the performance of the work the same sympathetic confidential relation be maintained between physician and patient or family as has ever characterized the efforts of true physicians.

At this meeting the preparation of a manual of instructions for physicians was authorized. This manual should be available at an early date. Examination forms, with which many of you are doubtless familiar, have also been distributed by the Association to the extent of 100,000 copies. At the 1925 meeting in Atlantic City it was further decided that, owing to the nationwide need and interest in physical examinations, the Bureau of Health and Public Instruction be empowered to call a conference to correlate the work already done and devise a nationwide plan for adoption. This is the conference which convened last week.

Besides the interest which the national organizations are taking in this matter, I might refer briefly to what some State and county medical societies are doing in a concrete way to promote this particular program. One State society (Massachusetts) has just issued a handbook for health examinations by physicians. The handbook, according to its authors, is not in the nature of a text-book of diagnosis or

treatment, nor an exposition of any new specialty in medicine, but is simply a description of the general technique of such examinations for the general practitioner whose function it should be to perform them. "We know," says the Committee which prepared the manual, "that by periodic careful physical examinations, with a standard of normality well in mind, the beginnings of certain diseases or tendencies toward them may be detected while they are still curable or preventable. Here again the family physician finds for himself a place in the practice of preventive medicine that can be filled by no one else."

Another example of organized activity is that of a county society (Medical Society of the County of Kings, Brooklyn, New York) which undertook to have physicians themselves take the lead in this work by undergoing health examinations personally. This same society sent circular letters to 2,500 physicians in the county which included the following observation: "The private physician is more or less familiar with the patient's interests and environment and therefore better able to render health service to the individual than is the case when the examinee comes as a stranger to a strange physician. This is important—the success of a health examination depends more upon the rapport between physician and examinee than does a diagnostic examination." One outstanding difficulty is referred to, that of the emergency nature of private practice. To overcome this disadvantage the suggestion is made that the examinations be planned for in advance.

Another significant undertaking to which I wish to refer is that of the Medical Society of the County of New York. The Society recently conducted a symposium, held at the New York Academy of Medicine, at which an impressive series of papers was presented by recognized leaders in their respective fields of medicine, covering practically every phase of medicine from the preclinical point of view. The introductory paper sounds the keynote of the symposium:

"A new field is opening for the physician. I venture to predict that in the future, all intelligent men and women will have their own health physician to whom they will look to keep them well and vigorous. This will not come until the public recognizes the fact that the physician can adequately give this service. To hasten the day and to insure its coming, we shall be wise to address ourselves to the task of becoming as efficient and successful in this field as in the field of prevention of communicable illness and the cure of disease."

A review of these several substantial undertakings, which by no means covers all that is being done, indicates that we are moving in the direction of a rather well defined effort to widen the scope of preventive medicine with the private physician occupying the key position. That the program which these examinations on a large scale contemplates is fraught with difficulties as well as with significant possibilities no one will deny. The nature of some of these difficulties I have already referred to. Slogans alone will not insure success. There are ancient traditional attitudes to overcome both on the part of the lay public and the physician. It is still customary for both to think of health as the mere negation of disease. Some of our medical concepts may have to undergo revision. Even words may play an important role in popularizing this movement for already we note a tendency to refer to the physician as "health counsellor" and the patient as "health client." I might suggest any number of problems calling for a solution if the procedure under discussion is to have anywhere near a universal application, but the difficulties, real as they may be, should not close our eyes to the significant and far-reaching implications of this prosposal. As I see it, there are important implications: (1) for individual, (2) for society, and (3) for medicine.

What such examinations will mean to the individual is perhaps obvious enough. Not only should the early detection of unhygienic habits, of functional disorders, and of minor as well as serious pathological conditions, make for an increased longevity, but should result as well in an increased efficiency and capacity for the enjoyment of life. Length, it is well to remember, is not the only dimension by which to measure life even from the medical standpoint. There is also the dimension of "breadth" which is positive health as distinguished from mere absence of disease. It is not enough that man should be permitted to grow old. He should have vigor and vitality in the prime of his life and as he advances in years he should not be forced to suffer the debilitating and disintegrating processes as-

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sociated with senility. Senescence for him should be as much a creative and productive period of life as any other. Such a prospect is certainly not beyond practical achievement.

There is no need, I am sure, to dwell at length upon the social implications of increased individual well being. We can estimate in a rough way the national economic loss resulting from illness and disability but who can say what the social loss is resulting from the impaired efficiency of the vast army of borderline cases—the half sick and the half well. Consider merely the heads of families who go on for years, vaguely conscious perhaps of deficient vitality, but who never seek medical advice or aid until they are partially or completely disabled for gainful occupation. A simple precaution or correction early enough might have sent them on their way to financial independence, resulting in higher familial standards of living in the educational and social as well as the economic sphere. The emphasis which organizations interested in social work and in the prevention of crime, delinquency, and dependency are placing upon health promotion and the support which they are giving to the health examination movement is significant proof of the importance of health among the social values.

And now, a final word as to the significance of this movement to medicine as a science. We are still too much inclined to place disease and health in distinct categories, and yet how well we know that the line of demarcation is imperceptible. Our knowledge is scantiest where the two appear to merge and for that reason we may look for new light and significant facts as more and more people, presumably well, are brought under the scrutinizing eye of the physician trained to detect danger signals. A solemn scientific duty will rest upon the examining physician to keep accurate records, to note all of the facts in the clinical or preclinical picture. The value of such painstaking procedure is already being demonstrated with respect to many disorders. Impairment of the cardiovascular system, for instance, suggests to the trained observer an increasing number of "causes." Whether the embarrassed condition is associated with syphilis, with focal infection, with overweight, or any number of other factors, needs to be f a i t h f u l l y recorded. As these case histories multiply and as we obtain larger numbers of individual clinical pictures covering a period of years, the significance of periodic medical examinations to medicine will become increasingly apparent.

PREVENTION OF PUERPERAL SEPSIS.*

By BURNLEY LANKFORD, M. D., Norfolk, Va.

"Ye shall know the Truth, and the Truth shall make you free" is the motto inscribed over the entrance to one of the noble buildings at the University of Virginia. The truth shall set us free from the results of error and ignorance. As applied to obstetrics, particularly that branch dealing with the prevention of sepsis, the knowledge of the truth began to free us from the results of ignorance with the work of Oliver Wendell Holmes in this country, and Semmelweis in Europe (1843 to 1847). They showed conclusively to all who *would* see, that sepsis, or what they called "child bed fever," was due to some "contagium" introduced from without. They showed that the time for the accoucheur to wash his hands was before, rather than after a delivery, as had been the usual custom up to that time. When this was done, the mortality rate began to fall at once, though they did not know just why.

This powerful searchlight of truth, directed by Holmes and his followers upon the cause of puerperal sepsis some eighty years ago, was followed about 1880 by a more brilliant searchlight still, directed by Pasteur, Lister, Bumm, Doederlein and others, showing conclusively that puerperal sepsis was due to living organisms, introduced from without in most cases, and, therefore, preventable. Does it not seem strange, then, that nearly one hundred years later, we should have 5,657 women dying of puerperal sepsis in one year, in the registration area of the United States, and this only 87 per cent of the total population area? Among other possible factors, does this mean that we, of the noble, altruistic and usually beneficent medical profession, have not put into practice the truths that we know? If so, we must face the music; we must clean house, if we would not be made to dance and have our house cleaned for us.

A greater than Holmes, Pasteur or Lister said: "If you love me you will keep my commandments," and this applied to us means that if we love the good name of the medical pro-

*Read as part of symposium on Puerperal Infection at the fifty-sixth annual meeting of the Medical Society of Virginia, in Richmond, October 13-16, 1925.

fession, if we are in earnest in the fight that the medical profession is making against puerperal sepsis, we will keep the commandments that, when kept, we know will lessen this fearful risk that every pregnant woman has to face.

Just as we learned from Holmes and Semmelweais to wash our hands before conducting a labor, before making a vaginal examination, we have now learned that we should and can keep our hands out of the vagina during the majority of the labors we are called on to attend. We have sufficient, accumulated, accurate evidence to show that the incidence of sepsis rises rapidly with the number of vaginal examinations made during labor, and that the lowest rate of morbidity following childbirth is among those cases having had no vaginal examination. Nor has the rectal examination turned out to be the panacea that was expected. We must convince *ourselves* that frequent vaginal examinations are not necessary and that they *are* dangerous. We must learn to approach every vaginal examination with this thought always in mind, "I may infect this woman, I know how not to infect her." With such a mental attitude always present, we will not make hasty or ill-advised vaginal examinations, and if we cannot make a clean one, we will not make any until it can be cleanly made. If this one rule were steadfastly followed in Virginia for one year, I believe the rate of our puerperal sepsis would be cut in half and we could hang out a record that would surprise the world. We must restrain ourselves from making a hasty or unnecessary vaginal examination in cases of threatened or incomplete abortion. Only in the presence of alarming (to us, not to the patient or family) hemorrhage should we invade the vagina in such cases. There is usually sufficient time to clean up before investigating abortion cases, and it is good practice to have everything ready to evacuate the uterus at the same time, either by the finger or placental forceps, if such a course be found necessary.

The next great commandment we should keep, faithfully and incessantly, is to keep our hands out of all sorts of filth, surgically speaking. This sounds trite, but if we would conquer puerperal sepsis, this is one of the things we must do. A doctor, in the daily run of his work, must necessarily come in contact with all sorts of surgical uncleanness, *but* his hands do not necessarily have to become infected. One thing the war taught us was to handle pus cases with forceps. We did not have gloves and we did have thousands of rotten pus cases, but we learned to dress them all day long without touching them with our hands and without getting our hands infected. This lesson can be carried over into every day, general practice. We must keep short and clean finger nails. This rule should apply as well to the nursing as to the medical profession. Death, literally, may lurk under the *long*, but beautifully polished and well kept nails of the graduate nurse. Let each man here look at his own and his neighbor's nails, and ask himself the question if his nails and hands are safe to make the vaginal examination he may be called upon to make tomorrow?

In order that internal examinations may not be so apparently necessary, more time and thought and *practice* should be given to abdominal palpation of the parturient woman. And right here, a lance should be broken against the present almost universal medical curriculum. The most recent report (not yet in print) of the joint Maternal Welfare Committee of the American Association of Obstetricians, and the American Gynecological Society, shows that among the medical colleges throughout the United States 18 per cent of teaching time is given to surgery and only 4 per cent to obstetrics. This means in general that the young doctor must go out into general practice and undertake the conduct of all obstetrics that applies to him, though he certainly would not be expected to do the same with all the surgery that occurs among his clientele. Although both are major branches of medicine, he has received more than four times as much instruction in one as in the other, and he is "short" in the one he will be called upon to practice under the most difficult conditions.

It is not enough that we should be clean ourselves before approaching a woman in labor; we must give *fore-thought* to the surroundings in which she will be delivered, in order that they may be clean and suitable for a safe confinement. Experience of recent years has proved that women are more safely delivered in well-appointed hospitals than in private homes, but the fact remains that for many years yet the majority of women will continue to be delivered in their homes. An important

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factor in the reduction of puerperal mortality from all causes will be the establishment of more hospitals in the smaller towns, where women may be more safely cared for, particularly those who develop the need for hospitalization after the onset of labor. The great increase of good roads makes most of the smaller towns accessible to their rural communities, and as soon as the general public realizes the value of hospitals for the conduct of labor, such hospitals will be built.

Confinement does not come to the family unexpectedly, like appendicitis or accident. The family and the attending physician have months in which to prepare for the important event, and if the surroundings are not clean, one or the other is to blame. Results obtained by students working in the out-patient departments of lying-in hospitals in the slums of our great cities prove that surgical cleanliness for deliveries may be had in the humblest homes. Clean sheets (not necessarily sterile sheets), and clean floors can be prepared, and the patient can be safely draped with four large towels (which *ought* to be sterile) one across the lower abdomen, one around each thigh and one under the hips.

As confinement may ensue unexpectedly during the last few weeks before the predicted date, husband and wife should be warned against the danger of sexual intercourse at least during the last two months of pregnancy. Every time intercourse is had, foreign bacteria are deposited in the vagina. Experimental work has shown that streptococci are present under the prepuce in 75 per cent of men examined as well as colon, staphylococci and other pathogenic organisms. The literature contains accounts of deaths from puerperal sepsis, where it has seemed certain that the infection came from coitus shortly before the onset of labor. This warning, then, is not fanciful, but one that should be sounded to every pregnant woman, and a practical point is to give this advice to the husband in the presence of his wife.

The preparation of the patient's person is still a debatable question. If a shower bath be available, either regular shower, or tube attachment to spigot, it will be well to have the patient given a good soap and water cleansing bath as soon as she goes into labor, but never a tub bath at this time, nor for that matter, during the latter weeks of pregnancy. Should the patient be clipped, shaved or left alone, with reference to the vulval hair? Should she be scrubbed with soap and water, should she have any of the various skin antiseptics, or should she be left alone with reference to the preparation of the delivery area? Opinion varies as to the answer to both of the above questions. Recent investigations (Fricke, working under J. W. Williams in the Johns Hopkins clinic) showed streptococci present on the vulva in 14 per cent and in the vagina in 8 per cent of clinic patients. Another series of women examined in their homes showed streptococci present on the vulva in 75 per cent. This would seem to show that the vulva and surrounding area is a very dirty area, surgically speaking, and it would seem a part of the nurse's or physician's duty to make some effort to render that area sterile before delivering the patient. By removing the pubic and vulval hair, a great nidus of infectious material would be at once removed, and with the application of some reliable skin antiseptic (which would not interfere with any bactericidal property the vaginal secretions may have), it seems reasonable to suppose that the delivery area would be safer than when nothing has been done. The death rate from puerperal sepsis per 100,000 of women population was 11.6 in 1900; for 1920 it was 12.2. If and when we find some reliable method of making the external genitalia sterile, and put such a method into practice, will not one factor in the cause of puerperal sepsis have been eliminated? Scrubbing with soap and water does not produce a surgically clean field, and, in addition, will certainly carry surface organisms into the vaginae of multiparae. The application of one coat of 3.5 per cent tincture of iodine, which is allowed to dry, followed by the application of another coat, which is likewise allowed to dry, and the excess of iodine taken off with copious alcohol sponging, will produce a sterile field in 90 per cent of cases. This should not be applied until the patient is almost ready to be delivered, and partially under an anesthetic, so that if pain be complained of, a few breaths of the anesthetic will bring relief. It should be applied by the physician himself, after he is scrubbed up and ready for the delivery. When thus carefully applied, it will *not* blister, and any pain complained of will be but momentary. Any physician who will use this technic for a year, and

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then go over his cases, will find that his morbidity has decreased. More recently, the use of mercurochrome 220 soluble has been advocated from numerous sources. To be effective, it should be used in 4 per cent solution (Mayes) and should be allowed to remain on the skin at least five minutes before making an examination or before any obstetrical operation is begun. Mercurochrome has the advantage of not causing any pain, but it is not so rapid in its action as iodine-alcohol, and leaves very unsightly stains. The routine use of either iodine or mercurochrome is probably the best method we have at present for preparing the external genitalia for delivery.

Shall the physician invade the vagina with antiseptics in the effort to make the vagina surgically clean? This is a question which remains to be settled, and at the present time cannot be accurately answered. Some of us are old enough to remember when the vagina was routinely douched before and after labor. This did not cut down morbidity and was finally abandoned. Then followed a period in which the vagina was held inviolate, and still the morbidity and mortality has not fallen appreciably. Now come other investigators and tell us that the streptococci may be found in the vagina vault in 55 per cent of parturients! If this be true, our women must have an immunity to their own streptococci, and one of our problems must be to aid that immunity as much as possible during labor by the relief of pain, the avoidance of long periods of wakefulness with pain (producing fatigue in long drawn out labors), the practice of "masterful activity rather than the watchful waiting of ignorance or inattention," the prevention of post-partum hemorrhages, the immediate repair of lacerations, the securing of adequate post-partum drainage, the early allowance of a liberal diet, and the insistence on a complete rest during the first forty-eight hours after labor.

Recent figures of our State Bureau of Vital Statistics show that death from sepsis among the colored women of the State is decreasing, but that among the white women it is increasing. In 1922, seventy-six colored women died of sepsis: in 1924, fifty-five. On the contrary, in 1922, seventy white women died of sepsis and in 1924 this had risen to seventy-six.

Colored women are attended largely by midwives and during the last three years it has been illegal for mid-wives to make vaginal examinations. The decrease of sepsis among colored women seems strongly suggestive of cause and effect relation between vaginal examinations and puerperal sepsis, which relation was brought out eighty-two years ago!

The most recent report of the Royal Commission on National Health of Australia showed that in 1913-14 sixty-four per cent of the women of Australia were delivered by physicians: in 1923 this had increased to seventy-nine per cent but the death rate from puerperal sepsis has remained undiminished between 1905 and 1924.

We can draw our own conclusions from figures like the above, which could be duplicated and multiplied from various other authentic sources. The most apparent conclusion is painful, but we must face it, namely, that we, of the regular medical profession, are not making use of the knowledge that we have in the conduct of our obstetrics. We *can* remedy this condition, and we *must*.

PUERPERAL INFECTION: MANIFESTATIONS AND END RESULTS.*

By L. A. CALKINS, M. D., Ph. D., University, Va.

If you could be told how always to prevent infection and then how, if it should occur in spite of you, always to cure it, there would be little need for a discussion of the many varied and persisting forms that this condition may assume. Because the condition cannot always be prevented, and because, when it does occur, it may present such a variegated picture, it is perhaps excusable to say something about the diagnosis in order to know when to apply and how best to use the various form of treatment. Nothing will be said of etiology or mode of production of these infections.

The extreme frequency with which puerperal infection goes undiagnosed constitutes the only excuse I have for appearing on this program. It was once my privilege to hear a veteran in the practice of medicine make the statement, that he had attended two thousand cases of childbirth without a single instance of puerperal infection. This gentleman made a perfectly honest statement. He did not know of a single case of puerperal infection in his experience. No doubt many cases occurred that he did not recognize as such. No doubt many

*Read as part of symposium on Puerperal Infection at the fifty-sixth annual meeting of the Medical Society of Virginia, in Richmond, October 13-16, 1925.

other cases occurred and were thought to be only a "weakness" on the part of the patient, and the physician was not summoned for relief. Probably the great majority of his patients were not watched for the occurrence of fever, rapid pulse, or the other signs of infection. All this was not because this physician did not have at hand the facilities for making a diagnosis of puerperal infection. It was because he had not been trained to the necessity of post-natal visits and to the strict obligation on his part to diagnose accurately puerperal infection as early as possible, in order to prevent the many dire results, which we know occur following this condition. More modern medical teaching, as well as the modern practice of obstetrics, provide for daily visits to the lying-in patient during the puerperium. The great increase in the visiting nurse service, both in city and country communities, has also given rise to a much more frequent detection of infectious processes in their incipiency.

Puerperal infection, in the broadest sense, includes all inflammations, which may occur anywhere in the body, during or closely following labor. We might say that puerperal infection is of two classes—first, pelvic; and second, extra-pelvic. Thromo-phlebitis and breast abscesses are two examples of extra-pelvic infections.

The symptoms and signs of puerperal infection are not different from the symptoms and signs of any other infection. The four cardinal characteristics are heat, swelling, redness, and pain (or tenderness), and are varied only according to the particular organ or part of the body in which they are situated just as the physiology of those different organs is varied. The problem of diagnosis is, therefore, theoretically, very simple. We expect an increase in temperature. We expect an increase in the pulse rate. We expect an increase in the leucocyte count, and if the infection be of such a type that the bacteria gain entrance into the blood stream, we may get a positive blood culture. In addition to these clinical signs, we find the physical signs of inflammation in some organ or some part of the body.

Our attention is usually first called to the patient by the elevation of temperature. We are very prone to pay more attention to a patient's temperature curve afer delivery than to almost any other feature of her convalescence. That this is not the best practice is agreed to by most authorities on the subject. According to Lea, one of our best modern authorities, "The pulse rate is in direct proportion to the amount of toxic products absorbed into the circulation and to the virulence of the infective organisms, and, if carefully observed, forms the most reliable indication that we possess of the gravity of the disease. The increase in the pulse rate often precedes the rise in temperature and it often remains fast after the temperature falls." I believe that, if I could have but one clinical feature of the puerperium on which to depend, I should prefer the pulse rate to any other.

The leucocyte count is also a great deal of help if properly interpreted. It is not generally known that the white blood cell count is normally increased during and following labor. A count of nine to ten thousand is now regarded as the average normal at the time of labor as compared with seven to eight thousand at other times. It is also generally accepted that a count of twelve to thirteen thousand on the third day after delivery is a perfectly normal occurrence. We cannot, therefore, regard counts of less than fifteen thousand as markedly pathologic after delivery.

Lastly, the blood culture is of a great deal of aid in determining the type of infection as between local inflammations, septicemia, and bacteriemia, but is not of paramount importance in determining treatment, because, as Dr. Gray will tell you, the treatment of all types of puerperal infection is essentially the same. The variation in treatment is largely between mild and severe infections rather than between types of infection.

In most cases the patient will not have symptoms pointing to any one organ or part of the body, so that our physical examination must exclude one organ or one part of the body after another until we find the part really affected. I teach my students to start at the top of the head, and examine the patient clear through the soles of the feet, leaving the pelvic examination until the last, because, by that means, we often find the offending organ far removed from the pelvis. Moreover, it is quite important, as the other speakers will tell you, to limit vaginal examinations as much as possible. I have often treated puerperal infection cases, either following abortion or following labor, for a week or ten days, or even longer,

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before a pelvic examination is made, because I have the utmost respect for an inflammatory process of this nature in the genital tract. I wish to stir it up as little as possible and only make examinations when localization or abscess formation is suspected. In other words, we make our diagnosis of pelvic inflammation at this time as much by exclusion of the rest of the body as by exact localization in the pelvis or pelvic viscera.

The time of incidence with relation to delivery is of considerable help in determining the cause of increase in temperature and pulse rate. Those elevations occurring on the day of delivery are the result of the trauma of labor, and are called by some "traumatic fever," or, they are the result of an actual intrapartum infection. These latter infections are usually of the amniotic sac or of the placenta itself, and, in such cases, are also manifested in the child in the majority of instances. On the third day after delivery we have an elevation of temperature and increase in pulse rate due to engorgement of the breasts or to true puerperal infection in its more limited sense. On the fifth to the eighth day we have the appearance of true mastitis and elevation of temperature due to retroversion of the involuting uterus with a resultant retention of lochia in the uterine cavity, while on the twelfth to the sixteenth day we have the appearance of thrombo-phlebitis. The exact time incidence is, therefore, of considerable help in detecting the type and locality of the infection present.

The amount of elevation of temperature and the character of the temperature curve is also of aid. The *height* of the temperature, especially at the onset, is of some prognostic value. The *type* of the curve is of help in differentiating the character of the infection. In the mild sapremias the temperature is subject to considerable variation, and is rarely very high. These patients are usually sick for quite a period, but almost uniformly recover. In septicemia, on the other hand, the temperature rises to a greater height, and is maintained nearly on a level. In bacteriemia we see a true steeplejack temperature varying from subnormal to 105° or 106°, and perhaps making several oscillations a day. Occasionally in a severe case of bacteriemia the temperature may remain high over a considerable number of hours. The height of the temperature may be at times misleading. Small areas of inflammation in the breasts may cause a temperature of 105° F.

The pulse rate, on the other hand, is a much more dependable criterion on which to base judgment, or render a prognosis. It is in almost direct proportion to the severity of the disease and will rarely be found to exceed 120 beats per minute in the absence of true septicemia, or bacteriemia. It is, in general, highest in those cases of bacteriemia in which the heart muscle is involved.

It needs no careful reasoning, therefore, for one to make a flat-footed statement that puerperal infection cannot always be diagnosed on one temperature and pulse reading a day, but the severe forms will nearly always be found if the patient is seen daily. Puerperal infection of any degree of severity will nearly always exhibit a leucocyte count in excess of 20,000. The blood culture will differentiate as between a septicemia and bacteriema and will, therefore, aid in the prognosis but will not materially help in the treatment.

As for the local findings one needs to know little about them, other than that there is no abscess formation, because the surgical and local treatment, except for the draining of abscesses, is practically nil. It has been estimated by many different authorities that abscesses occur in less than five per cent of puerperal infections. They are, therefore, the exception and not the rule.

As for the end results of puerperal infections, they are three—the great majority of the cases recover entirely; a small percentage die; and there is a middle group comprising a fairly large percentage that recovers only partially. It is this group in which we are most interested. Perhaps most of these women present sterility as the one permanent ill result, due in part to cicatrization and in part to cohesive obliteration of the tubes. A somewhat smaller number have present more extensive scar tissue formation in the pelvis, with resultant bladder or rectal symptoms. A considerable number have a more or less permanent chronic passive congestion of the pelvic tissues, and pelvic viscera, with varying symptoms of all kinds. Finally, a small group retain permanent effects in other parts of the body, presenting greater or lesser degrees of invalidism, in which one or more organs or parts of the body may be most prominent. Permanent obliteration of one or both saphenous veins with per-

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sistent milk leg, and bacterial endocarditis are examples.

I have given you no new information with regard to the manifestations or the end results of this very interesting condition. I can only hope that you may more readily recognize, and that you will be more persistent in your efforts to diagnose puerperal infection, rather than to look upon it as a disgrace if it should occur. I think that a conception of puerperal infection, somewhat similar to the one I have heard my "Old Chief" express with regard to perineal lacerations, might be well taken here. I have often heard him say that, "The disgrace was not in getting the perineal laceration, but lay rather in not finding and repairing it after it had occurred."

TREATMENT OF PUERPERAL SEPSIS.*

By B. H. GRAY, M. D., F. A. C. S., Richmond, Va.

It is the purpose of this paper to discuss briefly the treatment of puerperal infection.

For the proper treatment of puerperal infection, we must appreciate the physiological process which takes place in the uterus after the evacuation of its contents, as a result of retraction and haemastasis.

The sudden shutting off of its blood supply leaves the endometrium more or less covered by a layer of necrosing decidua which is cast off gradually by a process of surface starvation due to the active leucocytosis and the increase of the connective tissue cells which takes place beneath the decidua. This forms a granulating zone which prevents the invasion of all except the more virulent organisms. The entire cavity of the uterus becomes a granulating surface except the placental site, protected as in all surgical wounds by a granulating surface within a few days.

At the placental site, the thrombi in the open sinuses require a greater time for organization. This area is rough and raised and is covered with irregular masses of decidua, shreds of placental tissue, fragments of villi. Organization occurs in the thrombotic sinuses, while the bank of granulations thickens and causes exfoliation of the superimposed masses. This occurs from the tenth to the fifteenth day.

The effect of invasion of pathogenic bacteria upon these normal healing surfaces varies according to the nature and virulence of the organisms and the manner and the soil into which they are introduced.

It is well known that the female generative organs constantly harbor pathogenic bacteria, such as the streptococcus, staphylococcus, colon bacillus, and others.

The studies of Bumm, Natvig, Kronig and Winter seem to prove that the vaginas of healthy women in the last weeks of pregnancy contain streptococci and staphylococci in from 45 to 75 per cent of cases.

Polak states that any of the infective organisms singly or in combination may be found in the post-abortal or past-partum uterus.

Repeated cultures of the interior of the uterus at various periods of the puerperium show that its contents after twenty-four hours post-partum are seldom sterile; over 50 per cent of the cultured cases in Polak's Clinic on the fifth or sixth day post-partum showed the presence of infective bacteria within the uterus.

The studies of other investigators on the bacterial flora of the generative tract confirm these observations. In the majority of instances, these organisms may lead a saprophytic existence, while under favorable conditions they become pathogenic.

The uterus is normally protected from invasion from the interior during and after labor.

During labor it is protected by:

1. The membranes.

2. Newly let blood which has anti-toxic properties.

3. The mechanical scouring out by the passage of the foetus and placenta.

After labor, the uterus is protected by the establishment of the lochial discharges and the normal reaction of the uterine tissue. This is shown by the protective granulation zone.

Infective organisms must penetrate this zone or pass through abrasions or other injuries in the uterine tissues to get outside of the uterus. The more virulent organisms, such as the streptococcus and some strains of the staphylococcus, have the power to do this.

It is important for the accoucheur to bear these natural defenses in mind so that he will not interfere with nature's methods of protecting the puerperal woman.

Puerperal infection, like other infections depending on the inoculation of the puerperal

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wound by pathogenic bacteria, may be local or general:

a. The local infections are illustrated by the infected perineum, cervix, endometrium, in which the tissue reaction limits the spread of the infective organisms.

b. In the general infections, the organism is more virulent or there is a diminished tissue resistance and the infection spreads beyond the wound area. This spreading infection occurs through (a) blood vessels, in which case it may manifest itself as a thrombophlebitis, pyemia or bacteriemia, or (b) through the lymphatics, producing parametritis, perimetritis or peritonitis.

It is not within the scope of this paper to discuss the pathological anatomy of the various types of puerperal infection, although the treatment must necessarily depend upon the pathological changes the tissues undergo.

Admitting that the genital canal frequently harbors pathogenic bacteria and that puerperal infection is wound infection due to the inoculation of bacteria which may migrate from the vulva, vagina or cervix, the vast majority of infections are carried to the wounded surface by the hands or instruments of the accouchuer.

It is apparent from the foregoing that the prophylactic treatment occupies an important role in the treatment of infections.

We have been slow to practice strict asepsis and to appreciate the surgical principles involved in the conduct and management of labor and the puerperium.

The prenatal care of the parturient woman is too frequently overlooked and she approaches labor physically unfit—with foci of infections and lowered resistance.

Unnecessary vaginal examinations are too frequently made, and infection is proportionate to the frequency of vaginal manipulation. Trauma lowers tissue resistance and opens up avenues of infection. Traumatic procedure should never be undertaken without definite indications and proper preparations for them.

Preservation of the membranes allows sufficient time for dilatation of the cervix to proceed with the minimum amount of trauma. The physiological conduct of the third stage of labor, without hurried attempts at separation of the placenta and its manual removal, are important factors in the prevention of infection. Bourne states that in 154 cases of manual removal of the placenta at the Queen Charlotte Hospital, London, 35 per cent developed some form of uterine sepsis.

Curative Treatment

The curative treatment of puerperal sepsis is a question upon which there is a great diversity of opinion.

Within recent years there is a more marked trend to conservatism. Radical measures have been tried and have been found wanting. If one recalls the natural reparative process which takes place in the interior of the uterus following labor and upon which the treatment must be based, a more rational treatment would follow.

The uterine cavity following labor is a large wounded surface, and is the principal portal of entry of infective bacteria. The natural defenses which Nature has thrown around this area will in the great majority of instances protect it against all except the more virulent organisms. With the more virulent organisms, such as the streptococcus, local tissue resistance does not act as a complete barrier and the infection spreads beyond the cavity of the uterus.

It is obvious then how futile any intrauterine treatment would be, for it would tend to break down these natural defenses.

Maintenance of drainage and retraction of the uterus are the two important factors in all cases.

Drainage is accomplished by changing the position of the patient from side to side and by placing the bed in the modified Fowler position.

Retraction of the uterus aids drainage and tends to shut off the lymphatics: the use of pituitrin and ergot serves to aid retraction.

When there are infected wounds of perineum or cervix, sutures should be removed and the surfaces swabbed with iodine or mercurochrome, and free drainage established.

Cultures of the vagina and uterus should be taken to identify if possible the type of the infective organism.

It is a well-known fact that the action of certain bacteria may be limited to a local tissue reaction and thus a localized infection, while in others with a greater virulence the tendency is for the infection to spread through the lymphatics and blood vessels and then cause more generalized infections. Bacterio-

logical studies, then, of the lochia and blood are of great value in giving us a comprehensive plan of treatment. Blood counts should be frequently taken in order to check up the resistance the patient is making against the infection.

Various local measures have been advocated, such as vaginal and uterine douche, swabbing the uterus with different germicides, uterine packs, exploration for fragments of placenta and membranes, curettage, etc. Opinions differ as to the efficiency of these various measures. It is generally believed, however, that in the majority of instances they are more productive in spreading than in removing infection. It is the writer's personal conviction that the only indication for invading the cavity of the uterus is to control hemorrhage which is rare. Generally speaking, the various local treatments of the uterus provoke hemorrhage, lower the resistance and spread infection.

Infections which spread beyond the cavity of the uterus and attack the parametrium or pelvic connective tissue reach these spaces through the lymphatics and cause pelvic exudates or pelvic peritonitis. These are found in various places in the pelvis. Pelvic exudates are conservative processes and limit the spread of infection; the extent of the infection will depend upon the virulence of the organism and the resistance of the tissues. The treatment should aim at localization and limitation of spread by encouraging tissue resistance. Locally, in the acute stage an icebag over the lower abdomen, elevation to the Fowler position to drain the lymphatics, and opium to relieve pain are indicated; catharsis should be avoided, the lower bowel being kept empty by the use of enemata.

Milk injections, as suggested by Gellhorn for infections of the pelvis and general infections, are receiving favorable comment. The foreign protein activates the cells, stimulates the production of anti-bodies and increases phagocytosis. The injections are made with ordinary milk which is sterilized for ten miutes by boiling in a water bath. Injections are given into the gluteal muscle, 10 c.c. every third day. A moderate chill followed by a rise of temperature with nausea and headache are the phenomena that may follow. The reaction grows less severe with succeeding injections, and the number of injections vary from three to eight or ten, depending upon the condition for which they are given. Blood counts are taken before and after the injections to note the rise in the leucocytes. A hyperleucocytosis of from 20,000 to 25,000 is generally noted.

It would seem from the reports of Gellhorn, Rawles, Mohler and others that milk injections have a definite place in infections of the pelvis and other infections,—that the effects of the foreign protein stimulates a cell activity which causes an increased tissue resistance. It hastens absorption of exudates, shortens the course of the disease and in some cases complete restoration to normal is established. Chronic pelvic exudates are reduced to a simple pathology and operative intervention can then be resorted to with less pathology to be encountered. Milk injections have been especially valuable in gonorrhoeal infection.

In all types of infection, local and general, the supportive treatment is an important factor—nutritious food, fresh air, sunlight, rest, stimulation, all contribute to the building up of the defenses.

Infections which spread beyond the pelvis become more general, such as peritonitis, thrombo-phlebitis and bacteriemia. When the infection spreads to the peritoneum as evidenced by tympany, vomiting, muscular rigidity, elevated temperature and rapid pulse, food should be withheld and the following measures resorted to:

1. Stomach lavage for vomiting, morphine to relieve pain and quiet peristalsis, icebags to abdomen.

2. Nutritive enema of glucose and soda by the Harris gravity method.

3. Hypodermoclysis of saline under the breasts to favor elimination and combat toxaemia.

4. Fowler position.

If the evidence suggests the presence of pus, cul-de-sac drainage as practiced by Pryor may be attempted; the cul-de-sac is widely opened, gauze drains placed in the lateral walls of the pelvis, and the patient placed in high Fowler position. The peritoneum is drained of seropurulent fluid, which reduces toxaemia, and the effect of the gauze in the lateral pelvic walls stimulates the formation of plastic exudates which tend to confine the infection to the lower pelvis. Good results are claimed by those who use this method in selected cases.

In the blood stream infections, we have the

presence of bacteria which, with their toxins, cause dissolution of cellular elements as well as degenerative changes in the heart, liver and kidneys.

Puerperal thrombo-phlebitis and bacteriemia have an extremely grave prognosis; it is estimated that about 25 per cent of the latter end fatally, while in the former less than 50 per cent of the women recover.

C. Jeff Miller states that puerperal thrombophlebitis is found in from a third to a half of all women dying of infection. Miller makes a plea for early operation and reviews the literature from Freund's first article, in 1894, up to July, 1916. The tendency of the thrombosis to be limited to one vein is shown in Miller's tables. Of one hundred cases studied, the thrombosis was located in one spermatic vein in seventy-five cases.

Of the 197 operated cases collected by Miller, fifteen were treated by extra- and 182 by transperitoneal operation; the gross mortality was 51.6 per cent; the corrected mortality 33.9 per cent. The average mortality of pyemia by the expectant treatment, according to Miller, is between 60 and 70 per cent. Ligation of the veins is considered sufficient in pure septic thrombosis. Excision should be done for periphlebitic processes.

Polak believes that thrombo-phlebitis is a conservative process and leans to the expectant plan of treatment. In addition to this, he recommends small repeated blood transfusions if the resistance shows signs of failing.

From the reports of Miller, Williams, Turenne and others who have employed ligation of the thrombosed veins, this method evidently will have a place in the treatment of thrombo-phlebitis. Early diagnosis and prompt operation will no doubt reduce the present high operative mortality, which, from the reports, would lead one to believe that in many cases operation was resorted to as a last resort.

Our efforts in the main in combating these blood stream infections must aim at increasing the resistance by stimulating the production of anti-bodies and phagocytes in order to defend the body against the bacterial invasion. Attempts have been made to sterilize the blood current by injecting various chemicals and germicides directly into the blood stream. Within the last few years mercurochrome 220, evolved by Young and his associates at the Brady Institute, has been extensively used to sterilize the blood current in various types of blood stream infections. In the collected reports of 211 cases by Young, Hill, and Scott, of infections and infectious diseases treated by mercurochrome 220 by a number of observers, the results are most encouraging.

The percentage of cures in Young's cases were greatest in infections due to B. coli, staphylococci and gonococci infections—about 81.8 per cent. It was less in gram-positive diplococci, including the pneumococcus—66.6 per cent; in streptococcus hemolyticus—53.8 per cent; and least in streptococcus viridans—33.3 per cent.

Piper has had considerable experience with mercurochrome, and states that there are certain micro-organisms which are destroyed by mercurochrome more readily than others; he has been unable to make any impression upon the streptococcus viridans.

In the hemolytic group, the pyogenes are routinely fatal. Piper believes that in some cases of sepsis, mercurochrome in proper doses will be of great value. He does not contend that the method will effect a cure except in so far as it is possible to increase the individual's resistance, by temporarily eradicating the micro-organisms from the blood stream, and says we can conceive of the possibility of a cure where the blood stream was sterilized and the local focus of infection extirpated at the same time. The dosage advocated is 5 mgs. per kg. of body weight, or 23 c.c. of a 1 per cent solution per hundred pounds of body weight given intravenously.

The solution should be made from the granular form in freshly distilled water. The solution should not be boiled, as disintegration may occur. The reaction following the intravenous injection is not severe, and frequently there is little or no reaction. The reaction consists of chill, headache, nausea, rise of temperature and diarrhoea. The initial rise of temperature is followed by an early and decided drop, which may reach normal. The early use of mercurochrome is urged when indications for its use arise.

The serum treatment of puerperal sepsis was introduced by Marmorek in 1895 when he discovered an antistreptococcus serum. Great hopes were entertained at that time for the

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successful treatment by this method; unfortunately, the results have not been satisfactory. Since that time, other investigators have utilized polyvalent sera in the hope that numerous strains of streptococci would give more satisfactory results. More recently Bailey advocated the further use of polyvalent serum. Bailey emphasizes that the preparation of the serum must be efficient from a seriologic standpoint; the supply must be fresh, and desensitization must be carried out before its administration. With this precaution, the serum is practically harmless, although serum reactions are observed. The injection should be given slowly without dilution. The dose recommended is 100 c.c. every 24 hours; if serum sickness appears, no further treatments are given. If this dose is repeated each day for three or four days, a sufficient amount may be given before serum sickness appears. If the temperature rises in the post-partum period and remains above 103 for forty-eight hours, the dose of 100 c.c. should be given without waiting for the results of the cultures.

The mortality in six cases that gave positive intrauterine culture of streptococcus hemolyticus was 16.6 per cent.

In the second group of seven cases remaining, the mortality was 14.3 per cent.

In the two groups, thirteen cases in all, the mortality was 15.3 per cent.

Uncorrected death rate 21.4 per cent.

Bailey states that parametritis occurred so regularly in his cases that it seemed as though the serum had a tendency to localize the disease.

Inasmuch as blood stream infections cause destruction of the red cells and decrease in the hemoglobin, it is logical to assume that blood transfusion would at least temporarily raise these elements and increase the resistance.

Sir A. Wright says that immuno-transfusion surpasses ordinary methods of serum therapy in septicemic cases, inasmuch as we are dealing with compatible human blood, immunized in vitro, showing definite protective substances which can be incorporated in indefinitely larger quantities of blood transfused. They serve the double purpose of new blood and anti-bodies. Immunized transfusions are possible in chronic infections only.

Polak states that transfusion in infections would seem to serve the double purpose of lessening the secondary anemias and supplying normally active leukocytes for temporary defense; it permanently raises the blood pressure, which helps to restore the functional activity of the organs which bear the brunt of defense. Polak believes that the poor results reported by some observers are due to the delayed transfusion where it was used as a last resort.

Small repeated transfusion of citrated blood has been the method of Polak's clinic;—250 to 300 c.c. are given every third day. The transfusion is preceded by a third of a grain of morphine, which diminishes the severity of the reaction. Some reaction occurred in 60 per cent of cases. Polak at the time of his first publication on transfusion in 1919 reported four cases of thrombo-phlebitis with one death, and seven cases of bacteriemia with one fatality.

The writer has had one case of thrombophlebitis and one streptococcus hemolyticus bacteriemia in which transfusion was used, both of which recovered.

Conclusions

The prophylactic treatment of puerperal infection must occupy the most important role, which would include:

1. A complete examination of the patient in early pregnancy, including pelvimetry.
2. The eradication of foci of infection, such as the tonsils, teeth, gonorrhoea, etc.
3. Abstinence of the marital relationship after the sixth or seventh month. This is a frequently overlooked precaution and is responsible for a number of unexplained cases.
4. Checking up the case in the latter months of pregnancy to determine as far as possible the outcome of labor, and formulating a plan according to conditions as they obtain.
5. The course of labor should be followed by external and rectal examinations, resorting to internal manipulation only upon positive indications.
6. When internal manipulation is necessary, scrupulous asepsis should be observed and traumatism reduced to the minimum.
7. Isolated cases of infection will occur in spite of all the measures we may observe.

In the treatment of localized infections, the natural defenses should be protected by:

1. Refraining from unnecessary intrauterine interference.

2. By encouraging retraction of the uterus and drainage by:

(a) Administration of ergot and pituitrin.

(b) Posture for drainage.

Infections which have a tndency to provoke local inflammatory conditions, such as gonococcus, staphylococcus and B. coli, should be treated conservatively, and local tissue reaction encouraged by:

1. Posture for drainage.

2. Icebag over lower abdomen in acute stage.

3. Injection of foreign protein or milk to stimulate phagocytosis.

4. Avoidance of catharsis.

5. Surgical intervention to effect drainage when suppuration occurs.

In the treatment of general infections, thrombo-phlebitis and bacteriemia:

1. Nutrition, good nursing, air and sunshine are fundamental.

2. Transfusion of well-matched blood in small repeated doses is, to me, the most rational plan of treatment.

3. The intravenous use of mercurochrome can be used as a therapeutic measure with the hope of temporarily sterilizing the blood current and allowing the resistance of the patient to build up.

4. The use of gentian violet, bichloride and other intravenous therapy can be employed. It is largely a question of one's individual experience as to the results obtained.

5. The treatment with serum in my hands has been disappointing. The larger doses of polyvalent serum suggested by Bailey, given early in the course of the disease, may prove of value.

6. Ligation of the thrombosed veins, as recommended by C. Jeff Miller, Turenne and others, would seem to have a place where the diagnosis can be made early. I have had no experience with this method.

Stuart Circle Hospital.

DISCUSSION OF PAPERS ON PUERPERAL INFECTION BY DRS. LANKFORD, CALKINS AND GRAY.

DR. GREER BAUGHMAN, *Richmond*:—I think if I had written these papers myself I would have made very few changes in what the gentlemen have suggested to you. The broad principles are all there; I failed to note the absence of a single one. Of course, each of us has a little different approach, but the broad principles have certainly been well stated. I am just the bell sheep that is leading the way for discussion. I hope some of you gentlemen will differ from the opinions expressed by these three men, and that we shall have a real verbal fight.

Over a period of ten years we had 2,341 clinical cases, with 13.1 per cent infection. By infection we mean any woman during the puerperium whose temperature rises above 100.4 after the first physiological reaction. Out of that number I am almost ashamed to tell you how few deaths there were, because I think it was pure luck. We had only two deaths. There was an incidence of about one death from puerperal infection in a thousand births. Before you discuss that, let me acknowledge that our women are a little better and stronger and more resistant to infection than elsewhere. Up to this time, the question of infection has certainly not been a serious one in our clinic. I think the reason we are getting good results along the line of low infection is because, in season and out of season, we have taught the students that they can prevent infection with the two simplest things. One thing you carry always with you, and the other thing you carry in your obstetrical bag. The thing you carry always with you is your arms and hands, and the other thing is a rubber glove.

With our two arms and hands we make external examinations, reserving internal examinations for those cases that we expect to operate upon. With external examination alone, we do not make uniformly as perfect a diagnosis as can be gotten by both external and vaginal examinations, but sufficiently accurate for all working purposes. Secondly, instead of making routine vaginal examinations, we make rectal examinations. The reason for making rectal examinations is perfectly obvious—to keep out of the vagina. Whether you accept Döderlein's idea, that during the last few weeks of pregnancy the vagina takes over a sort of prophylactic action, or whether you think the vagina and uterus are full of bacteria, it makes no difference, because if you mechanically enter that vagina, if there be any bacteria you will certainly shove them ahead of your hand. Unless you are a much clever examiner than I am, or the people I know of, you will carry them into the uterus on your examining finger. I think what Dr. Lankford has told us about the difference in incidence of puerperal sepsis in the cases of doctors and mid-wives is due to the fact that midwives do not examine their patients, and doctors do.

The second thought I want to give you is on the question of treating these cases after they have developed. I want to emphasize what Dr. Lankford or Dr. Calkins said—we must know with what we are dealing. We must not be embarrassed at having infections, because they will come sometimes whether the patients have been examined or not. We must know that we are dealing with infection, and not think that the bowels are a little wrong and the patient will be all right in a few hours. Let us take the opposite view, that where the temperature rises to 100.4, after the first active rise, the case is an infection, unless the fever is coming from the tonsils or teeth or something else. Let us change our point of view, and take our responsibilities. So long as we are thinking that the bowels are the causative factor, we shall not be doing all we can to make the woman get well quickly.

To my mind there are two principles involved in the treatment of puerperal infections. The first principle is to try to increase the resistance of this particular woman in order that she may cure herself. Of course, to be honest, that is the way we get rid of all sorts of diseases. The second thing is to put salt on the tail of the bacteria. How do you increase the woman's resistance? What is probably the best way? Let us see what nature is doing. I believe that the increased leucocytosis to which

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Dr. Calkins called special attention in his paper is a plan of nature to give that woman more leucocytes at the time of her delivery, because Nature knows that a lot of doctors are going to examine her and run a chance of infecting her. Nature learned a long time ago that the woman, during delivery, is apt to become infected and, consequently, she has added to the number of leucocytes to overcome that particular thing. If that be true, how can we increase the leucocytes of this individual?—because it is with leucccytes that we cure. One way, and the general way, is to build up resistance, as has been suggested. Food, in spite of temperature, if they can digest it, and all they can digest; sunshine, fresh air, rest, cheerfulness—in short, good care—are all essential in building up resistance. Another way is by the injection of foreign protein. The injection of sterile milk is very effective. There is another method, which does not seem to increase the leucocytes so much, but does other things well, and that is the injection of ten c.c. of human unmatched blood into the woman's back, subcutaneously. This injection of blood not only introduces protein, but iron as well. About five or ten c.c. under the skin will disappear in twenty-four hours with very little discomfort—in fact, not as much as from the milk—and will give a right considerable kick. If the case be extremely anemic, I give blood; if not, milk. Meanwhile, I am preparing and having that patient matched for a transfusion, which is, I think, the next step in the treatment. For Heaven's sake, have the blood well matched, because you can jerk these women into kingdom come in no time. Use direct blood, instead of citrated blood.

Dr. M. Pierce Rucker, *Richmond*:—Like Dr. Baughman, I find my chief function is to agree with these three papers, but there are several points I should like to emphasize, in Dr. Lankford's paper, especially. One is the question of education, and the unbalanced education our medical schools are giving, turning out these men short, as he says, in obstetrics. That is a very important point, and I am glad he brought it out.

Another point Dr. Lankford mentioned, but, I think, did not emphasize enough, is the resistance of the patient. I think we have perhaps been too intent on washing our hands, etc., and have forgotten the patient, and have not built up her resistance as we should.

As a matter of historical interest, and without detracting in the least from the credit due either Oliver Wendell Holmes or Semmelweis, we ought to bear in mind that Charles White, of Manchester, was probably the pioneer in this work of the prevention of puerperal sepsis. In 1833 he wrote a treatise on this subject, and when reading that treatise now it is curious to find how little we have done except to name the bacteria that cause the trouble. That is about the only thing we have done since Charles White's time. You may remember that he lived in the time when it was customary not to change the bed linen, but to cover the patient up with blankets and keep the windows shut, for fear of the patient's catching cold, etc. He insisted upon fresh air, clean water, clean bed linen, nourishing food, and posture. He made his patients sit up to eat and sit up to nurse their babies, and got them out of bed not later than the second or third day. This treatise, "A Treatise on the Management of Pregnant and Lying-In Women and the Means of Curing, but More Especially of Preventing the Principal Disorders to Which They are Subject," was so good that it went through several editions, and was translated into several foreign languages. Oliver Wendell Holmes mentions White's results in his classical essay on the contagiousness of puerperal fever, citing Dr. Charles White's results as proof that it is a contagious disease. Dr. White's methods were taught rather widely in England, so that his pupils got similar results. Boer, who was trained in England, had a mortality of 1.3 per cent in the thirty years (1789-1819), he was in charge of the Allgemeines Krankenhaus, in Vienna. Under Klein, Boer's successor, the mortality rose to nearly 10 per cent, and it was not until Semmelweis took charge, in 1848, that the mortality fell, his figures being 1.27 per cent among 3,556 patients.

In regard to Dr. Calkins' paper, I should like him, in closing, to say something about the leucopenias that some of these cases have. From my experience, I rather fear the cases that have, instead of a leucocytosis, a leucopenia—when the white blood cells drop to 3,000 or 4,000, or something like that.

There is another type of puerperal sepsis that I think is not generally recognized as puerperal sepsis. Such cases as that Dickens so graphically describes in Dombey and Son were formerly attributed to exhaustion. Fitzgibbons, of the Rotunda Hospital, says you should not diagnose these as shock or exhaustion until you have made a culture from the peritoneal cavity. He says you will often get a pure culture of streptococcus from the peritoneal cavity, even when macroscopically no lesions are noted. I think that is quite important, and that we ought to bear it in mind.

In regard to the treatment, I feel very hopeful about these milk injections that Dr. Gray emphasized. Since hearing Gellhorn's original paper, I have tried it with a good deal of success. It works out very nicely. I think the point is that you should not wait too long before starting the treatment. As Dr. Baughman says, you ought to make your diagnosis early, accept your responsibility, and start treatment promptly.

Dr. Burnley Lankford, *Norfolk*, closing the discussion: I should like to say a word or two about drainage. We know the value of drainage as a broad surgical principle, but it is questionable with me whether we take advantage of it in our postpartum cases. It seems to me that the head of the bed should be elevated in every case as soon as the woman reacts from the strain of labor. In addition to that, several times during the twenty-four hours she should be turned on her face and kept in that position for half an hour or an hour. We were taught, several years ago, that as soon as the woman was delivered, particularly if she had any lacerations, she should have the knees bound together. If you think, you will see that if the woman keeps her knees together the upper part of her thighs effectively closes the vagina and makes drainage very difficult, if not impossible. Another thing is that if the bed sags a little, the hips, being the heaviest part of the body, will sink down, the vagina will be higher than the uterus, and a pocket will be formed between the vagina and the cul-de-sac in which the discharges will be retained.

We should recognize that it is not possible to prevent every case of puerperal sepsis. I think we should do as Dr. Baughman says, accept every case as an infected case, take the responsibility, and treat accordingly.

A word in regard to pelvimetry. I think pelvimetry in early pregnancy is certainly of value in the preventive treatment of sepsis. I think the only pelvimetry of any value is internal pelvimetry (with two fingers), and outlet pelvimetry. We can find

out the condition of the pelvic canal only by careful, gently conducted examination, not when the woman first comes to you, and not just before labor, but after Nature has partly prepared her vagina for the labor. The best time for internal pelvimetry is at the seventh month, and that should certainly be done.

As to immunity, we should certainly give more attention to the relief of pain and of long drawn out labors.

Polak has proved from animal experimentation that animals, if given a certain dose of an infective organism after they have been subjected to fatigue or hemorrhage, will succumb, whereas animals not so subjected will not succumb. Certainly any woman who has gone through the fatigue of a long labor and suffered with trauma and hemorrhage at delivery, is in a condition to become infected. We should see that they do not become fatigued, and we should repair lacerations immediately afterward.

As one of the speakers said, sufficient diagnosis for working purposes can be had by abdominal examinations and rectal examinations in *most* cases.

Dr. L. A. Calkins, *University*, closing the discussion:—I want to indorse the routine elevation of the head of the bed after delivery, as soon as the first shock of delivery is over, and I want more emphatically to indorse having the patient lie on her abdomen as soon as she comfortably can for two or three periods during the twenty-four hours. It is certainly an aid in drainage, and also helps to prevent retroversion.

As to Dr. Rucker's question about leucopenia, I do not believe that a leucopenia after delivery means anything different from a leucopenia in any other kind of infection in which you expect a leucocytosis. It simply means that the infection, momentarily at least, is so overwhelming that the body can not react and produce a leucocytosis.

I think if we carry away just two ideas from this symposium it will have been worth while. The first idea is that we should be very active in our prevention of puerperal infection, and that we should be very active in diagnosing puerperal infection. The second idea is that we should be rather passive in our treatment of labor, and passive in our treatment of puerperal infection. I mean by that, we should not make too many manipulations, whether it be vaginal examinations during labor or local treatment after infection occurs. If we remember the saying of a very famous teacher and apply it to our practice in this respect, we shall get better results. This exhortation was, "If you can not do them any good, don't do them any harm."

Dr. B. H. Gray, *Richmond*, closing the discussion: I tried to emphasize in my paper that the natural defenses that Nature throws out in infections should be respected. The least interference may sometimes undo these defensive processes. Treat them conservatively.

When infection occurs, get to work and try to push the resistance. The greatest good we can accomplish is by helping out by those methods which will increase the resistance and thereby kill out the infections.

Operative procedures should be resorted to only when the infection is localized, and then drainage of the circumscribed area is the object to be accomplished.

The use of serum for the most part has to me been disappointing. When used, it should be given early in the disease and in larger doses than have heretofore been recommended. Sensitization tests should be carried out before using serum, for by this caution fatalities will be guarded against.

In pelvic thrombophlebitis, ligation of the thrombosed veins, as advocated by C. Jeff Miller, Turenne and others, would seem a rational procedure in those cases where a diagnosis can be arrived at early.

At the present time, the operative mortality is about fifty per cent, which is little or no improvement over the cases treated conservatively.

DIAGNOSTIC STANDARDS OF THE VIRGINIA FIELD CLINICS.*

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and
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The diagnosis of tuberculosis in its incipiency is one of the most difficult problems confronting the internist. Mistakes are most frequently made on children and in the adult non-bacillary cases. No classification or standardization of methods may be entirely satisfactory. I hope, however, that a discussion of the system we use in making a diagnosis in our clinics will create an understanding that will let us work together.

Dr. Lawrason Brown, of Saranac, suggests that at least one of the following signs or symptoms be present before a positive diagnosis is made, viz.,

1. Tubercle bacilli in sputum.
2. Moist rales above level of second rib.
3. Expectoration of a drachm or more of blood.
4 Parenchymatous X-ray lesion.
5. Pleurisy with effusion.

These have been generally accepted by sanatoria throughout the country as a working guide in the determination of tuberculosis. A system that is practical for a corps of specialists with well equipped laboratory and X-ray departments is, however, of little benefit to the private practitioner or dispensary clinician with equipment limited to stethoscope, thermometer, scales, and fountain pen. We believe, however, that even with this limited equipment a trained man will be able to diagnose or suspect the earliest exudative lesion, the condition that exists before tissue destruction begins. If we always wait to prove one of the afore-mentioned diagnostic criteria, we have in many cases allowed our patient to progress from the curable stage to one of hopeless chronicity, or to untimely death.

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One of the most important steps toward diagnosis is the taking of a complete history. This is too frequently ignored or dismissed with a few perfunctory questions. Phthisis is no respecter of persons, yet very often some knowledge of the occupation, home conditions —domestic tranquillity or incompatibility— kind and quantity of food, general surroundings, and economic conditions, materially aids diagnosis. Modern science has proved the fallacy of hereditary origin in pulmonary tuberculosis. It is, however, of definite importance when we hear that a parent was tuberculous during the infancy or childhood of the patient, or that some other kinsman or an employee of the household was known to have had tuberculosis. Apparently, a child with a tuberculous mother is twice as apt to become infected and break down with tuberculosis as if his contact were on his father's side. The following figures taken from our case histories indicate that intimacy of contact is an important and deciding factor in infection:

With positive parental contact.....267
Contact with mother.....175
Contact with father 92

Up to five years of age, the child is a house animal and its mother is its closest companion. Paternal contact differs in that the father spends comparatively little of his time in his home. Childhood infections are held responsible for about 90 per cent of adult disease. Infection is usually harbored in the pulmonary lymph glands, causing no trouble until the defensive forces of the body give way because of unusual physical or mental strain, or from malnutrition or some debilitating illness.

Among precipitating illnesses, influenza heads the list. There can be no doubt that the 1918-19 pandemic was the spark that rekindled the fire in many an arrested or quiescent case. Records of 1,200 positive cases show that 20 per cent gave influenza as the exciting cause of their illness. Pneumonia will come second, because of its high incidence, and its devitalizing effects on its victims. Of childhood diseases, measles and whooping-cough, on account of their catarrhal nature and their effect on the lungs and bronchial tree, most frequently render children susceptible to tuberculosis.

Symptoms immediately preceding the illness are of special importance, and are for the most part toxic in origin. They are, in the order of importance, fatigue, impaired appetite and digestion, loss of weight, and inability to perform with ease the usual duties. An unexplained loss of weight beyond the normal seasonal variance, accompanied by an afternoon rise of temperature and acceleration of pulse, must be regarded as suspicious. An afternoon rise of temperature has long been considered a valuable symptom. Accurately to estimate its significance, it is important to have the patient keep a four hour record, beginning at 8 A. M. A constant rise of a degree above normal in the afternoon, or a discrepancy of two degrees between morning and afternoon, is of strong diagnostic help. Children normally show greater susceptibility to external atmosphere than do adults. It is not unusual to find groups of healthy children on hot afternoons with mouth temperature of 100° F. This is more frequent in those who have not had their tonsils and adenoids removed.

I would like to emphasize the frequency with which fatigue is found to be first symptom of tuberculosis among our clinic patients. I do not mean physiological tiredness that follows mental or manual work, but an over-powering sense of weariness that makes the unhappy victim feel as though further exertion were impossible. There are other chronic debilitating diseases which produce this symptom, but none so frequently or so profoundly as tuberculosis. Generally associated with it is impairment of appetite and distaste for articles of food formerly enjoyed, with a special aversion for fats. Gastric disturbances are common, with flatulence and hyperacidity.

A close analysis of the patient's history on the preceding points is preliminary to the examination. The first essential in the latter is to have the patient stripped to the waist. The practice of examining men with their shirts on and women through their shirt-waists is mentioned only to be condemned. It will take all your faculties to discover the earliest lung changes with only the soft tissues and bone between you and the lesion. Why add to your difficulties layers of calico or madras?

It is best to seat the patient on a revolving stool facing a good light in a comfortable room. Inspection of chest configuration is useful in directing our suspicions; but tuberculosis may be present in any type of chest. The long flat phthisical chest of Hippocrates fre-

quently waits to make its appearance until after even the neighbors have made a diagnosis; but we must look for the early lesion. Asymmetry of form seen in unilateral deepening above the clavicle or a flattening or retraction in the second or third interspace, the so-called hilus dimple, or restricted expansion, give us valuable information to underlying pulmonary disease.

Palpation is of little help, as vocal fremitus is apt to be confusing in early cases. It is, however, of value in locating the apex beat of the heart and in determining muscular rigidity.

Light percussion is of value in bringing out differences of resonance at apices. It must be borne in mind that the note at the right apex is normally less resonant and is higher pitched than at the left. The earliest demonstrable changes are impaired resonance and narrowing of the normal strip of resonance across the shoulder, the so-called Krönig's isthmus. Percussion should be carried from below upward, for the lesion of tuberculosis is most often at the apices; and minor shades of impairment are best recognized when going from normal to abnormal.

Tuberculosis should be diagnosed before there are any rales. This may sound like a radical statement, but it is perfectly possible to make diagnosis on changes in breath sounds and other signs previously mentioned. If we wait for rales, we in too many cases allow our patient to progress into the moderately advanced class, with the odds greatly increased against permanent cure. What, then, are the earliest auditory changes? The inspiratory murmur is feeble or rough in quality, the so-called granular type of breathing; the expiratory phase, which is normally very short and barely audible, is prolonged and high pitched, and simulates very closely bronchovesicular breathing; the voice sounds may be increased or diminished depending on the air content of underlying tissues. In order to bring out the fine rales and mucous clicks inaudible in ordinary or deep breathing, have the patient exhale, cough and draw a deep breath, repeating the procedure while you carefully listen to every portion of the chest. In no other way can you so readily bring out the earliest positive diagnostic signs.

Cases that show any of the absolute signs are without a doubt tuberculosis. But there are many patients with histories of slight streaks, persistent cough, bronchitis, asthma, under-weight, fatigue, failing appetite, dry pleurisy, fistula in ano, or prolonged exposure in childhood or after maturity. These patients, even though definite physical findings are absent, should be kept under constant supervision while every effort is made to build up their defensive forces by rest, hygienic surroundings, and correction of any obvious defects, such as bad tonsils and carious teeth.

The stumbling blocks in the differential diagnosis of tuberculosis are syphilis, myocarditis, hyperthyroidism, and focal infections. The patient with syphilis will often give a history of initial lesions; will be more apt to complain of dizziness, darting pains in limbs and bones, confused mental states and neuralgias. On examination, any one of the following will suggest syphilis: enlarged epitrochlear glands, perforated palate or septum, old tibia scars, fixed, irregular, or unequal pupils, irregular knee jerks, and unsteady gait, with little or no loss of nutrition. The presence of Hutchinson's teeth in children is very suggestive of congenital lues. Routine Wassermann examinations should be made where any of the syphilitic signs exist.

A great many cases of sub-acute or chronic myocarditis have followed the influenza epidemic. Many of these people are suspected of being tuberculous. We find among them histories of slow convalescence following influenza or pneumonia, chronic tonsillitis, or recurrent attacks of arthritis with indefinite precordial pain, palpitation, varying degress of dyspnoea, and inability to do any physical work without exhaustion. In this last respect they differ from the tuberculous, whose fatigue follows and does not accompany the exertion. Examination shows disturbed rhythm, low blood pressure, and functional murmurs, with little or no disturbance of temperature.

Mild hyperthyroidism is very difficult to differentiate from early tuberculosis, since the symptoms may be identical. Extreme nervousness with a pulse rate of 130 or more, slight enlargement of the thyroid gland, full eyes, fine digital tremor, and a relatively high pulse pressure, with negative lung findings would not justify a positive diagnosis of tuberculosis, although it is necessary to keep the patient under observation for many months. High meta-

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bolic rate may be a diagnostic indication in some cases, although many thyrotoxicosis cases are reported to give normal readings.

Focal infections in the facial sinuses give the differential symptoms of unilateral headaches, areas of tenderness over the infected sinus, and a copious muco-purulent or blood-streaked discharge from the nose. Such symptoms would call for transillumination of the sinuses. The presence of crowned teeth, Riggs' disease, or unerupted wisdom teeth in people suffering from chronic toxemia, would indicate special diagnostic measures to eliminate these as causative factors. Realizing that even the earliest symptoms of tuberculosis are toxic in origin, we follow the practice in the clinic of making a tentative diagnosis in all cases of focal infections, thus placing the patient in the hands of his physician for further study.

Tuberculosis in children produces a different clinical picture from that seen in adults, and constitutes an entirely different and more difficult diagnostic problem. The disease is essentially and primarily lymphatic, whether the manifestation is osseous, articular, abdominal, or pulmonary. In infants under three years, the process is usually an acute infection of a generalized miliary tuberculosis, with meningitis practically always fatal, or the abdominal form with symptoms of pyemia, and a mortality of 80 per cent. In the childhood forms, the glandular system is most often affected with the greatest incidence of infection in the tracheo-bronchial and cervical glands. Sixty per cent of the children between the ages of seven to fourteen who have visited the clinic in Virginia, have had palpable cervical glands. The majority of these are due to infections in the teeth, throat, and post-nasal space. We do not diagnose them as scrofula unless they are unusually large, have become matted, or have suppurated, and appear in children who are mal-nourished, anemic, and febrile. When persistent enlargement continues after all possible foci in the throat and nose have been removed, it should be accepted as tuberculous in origin. Enlarged glands posterior to the sterno-cleido-mastoid muscle are rarely tuberculous. In children under five years of age, a positive von Pirquet may be indicative of tuberculosis, but is not conclusive evidence, for tests made on large groups of children showed a high percentage of positive re-actors.

The physical sign of enlarged tracheo-bronchial glands is depression in the second interspace near the sternum when the breath is held after inspiration. This dimpling, with para-vertebral and para-sternal dullness and increased transmission of whispered voice from the seventh cervical to the fourth dorsal vertebra, when the bell of the stethoscope is placed directly over the tip of the spinous process, accompanied by more or less harshness over the balance of the lungs, is indicative of childhood tuberculosis of the hilus region. Rales are seldom heard unless there is an associated bronchitis, and they have a tendency to disappear after deep breathing and cough. If persistent rales are heard over the upper lobes, the case is no longer of the juvenile type and the prognosis is exceedingly grave.

Children 10 to 15 per cent underweight, with a constantly recurring evening fever, fickle appetite, aversion to milk, undue fatigue, mental depression or anemia should be considered potentially tuberculous and be treated as such. Careful laboratory work should exclude intestinal parasites, kidney involvement, and other probable causes. While the study proceeds, the child should be put on the cure at home. X-ray examinations are very useful in determining hilus thickening and parenchymatous lesions. It cannot, however, be used as an index of activity, as the symptoms and appearance of the child alone can do that. Sputum examinations are of no service—small children practically always swallow their sputum, and among older children the sputum is seldom positive.

In all our clinic work, we realize that we must depend upon the patient's physician to follow our tentative diagnosis with a more careful study of the case. In the brief time at our disposal, it would be impossible to make even a tentative diagnosis of the early case, unless we could count upon the co-operation of the local physicians. Since, however, the object of the clinic is to find the hitherto unsuspected case and to place him under the care of his own doctor, we give the doctor full information of our tentative findings on the diagnostic slip which is carried to him by the nurse immediately after the clinic.

We class patients as positive who give a sufficient number of the following symptoms or signs:

1. Fatigue, slight afternoon temperature, impaired digestion, loss of appetite and weight.

2. History of contact in childhood.

3. History of hemorrhage of a drachm or more.

4. Asymmetry of form, or restricted expansion.

5. Impaired resonance and narrowing of the normal strip of resonance across the shoulders.

6. Barely preceptible fine rales and mucous clicks.

In the "suspicious" group we place all patients who give a history of fatigue, contact in childhood, or "streaks," when even the slightest change of chest form or sounds make us suspect underlying disease. It is to this group that the clinic is of most service. These patients have ordinarily not considered themselves sick enough to go to their own physicians. They frequently come to us out of curiosity. Among them are to be found many of the earliest and most curable cases. Their cure depends upon the patience and sympathy with which their own doctors continue our initial examination. Could we not count upon help of the local doctor, we should feel ourselves no longer of service. This is true of the whole field of our work. Our clinic physicians never see the patients after the examination. We place them in hands of the practicing physicians, together with a report of our findings and our recommendations. Through the clinic propaganda, we endeavor to teach the people to go to their doctors before they feel seriously ill. We hope in this way to insure a diagnosis of tuberculosis in the earliest stages. Here, again, our success depends upon the co-operation of the doctors.

During the past nine years the death rate from tuberculosis in Virginia has fallen a little over 33 1/3 per cent—from 185 per hundred thousand to 112 per hundred thousand. It can only fall rapidly where the people are educated in early symptoms and in methods of cure. It is because of this that we make tentative diagnoses under clinic conditions. Through your co-operation in the further care of the patients thus found, we will together attain the object of our work—the control of the scourge which even now is taking an annual toll of 2,700 lives in Virginia.

INDICATIONS FOR AND AGAINST ABDOMINAL DRAINAGE.*

By W. DENNIS KENDIG, M. D., Kenbridge, Va.

Drainage of the abdominal cavity presents certain definite problems. The most important of these is whether in some cases to leave in drainage or close the abdomen without drainage. In a large number of cases there is, without question, no indication for drainage. In others, drainage is most clearly indicated. It is in the border-line cases that we are confronted with some uncertainty. Here, authorities differ, without giving very definite reasons for the faith that is within them, except that the surgeon should exercise good judgment. There should be something more definite. For this reason, I am presenting this paper, with the hope that a free and full discussion will tend to clarify the question.

In the consideration of this subject it would be well to review briefly some of the principles involved in abdominal drainage.

A few years ago the peritoneum was considered an absorbing membrane only, but now it is recognized that this membrane has a resisting power and that it is capable of overcoming, by this power, many abdominal infections, since the resisting power of the peritoneum for re-absorption and its power of defense has been recognized, less abdominal drainage is now being used than formerly. It is a fact, however, although the peritoneum has this natural protective quality, that drainage should be employed in some instances to assist the membrane in its fight to overcome bacterial invasion.

The principles of peritoneal drainage have been thoroughly discussed by Horsley, Lahey, Payne and others.

The peritoneal cavity is an enormous lymph space, and, under altered physiological conditions, is capable of supplying a great amount of exudate or transudate, which is made up of serum and lymph, rich in phagocytic cells. The presence of drainage material in the peritoneal cavity, through irritation, alters the physiology of the parts adjacent to this foreign body, and causes an out-pouring of this exudate or transudate. Thus, drainage material after being placed in the peritoneal cavity, becomes completely enmeshed or walled-off with a dense layer of fibrin, which is impervious to

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the passage of fluids. The drainage material is usually thus walled-off within six to twelve hours or more, the time being determined by the defensive reaction of the tissue and the kind of drainage material used. The result obtained is the formation of an impervious sinus around the drainage material from the area at the end in the abdomen to the point of exit. This would indicate that the peritoneum does not drain in the general acceptance of the term. Also, it shows, as stated by Lahey, that a drain, to be of value, must be placed within one or two inches of the point of origin of the infection. One exception to this is the use of a drain in cases of considerable abdominal pressure. Here the large quantity of exudate and complicating peristaltic paralysis brings about abdominal pressure, and the abdominal pressure weakens the tissue resistance by a severe toxemia and by diminishing the blood supply to the parts. It is a vicious cycle, which is temporarily relieved by opening the abdomen. The use of a drain in this instance during the first few hours after operation before impervious adhesions are formed about the tube, will materially assist in preventing an immediate return of the pressure condition.

It is obvious, therefore, that the use of a drain in the abdomen is limited.

The general advantages and disadvantages of the abdominal drain should be given consideration.

A fecal fistula may follow the use of a drain, especially if the material is placed adjacent to an injured intestine. A secondary infection may follow the drain from the outside. The use of the drain unquestionably promotes the formation of adhesions, prolongs convalescence, is conducive to operative ileus, and may weaken the abdominal wall so as to make a post-operative hernia more probable. Willis, in his experimentation on dogs with abdominal drainage, reports that, in addition to other results, the omentum may become attached to the adhesions around the drain. In view of these disadvantages, abdominal drainage should be used only when needed. In primary closure, the after-treatment is less painful, shock is diminished, and the time of convalescence is shortened. There are fewer complicating fistulas, a smaller number of post-operative hernias, and less extensive resulting adhesions. Primary closure of the abdomen is, therefore, the method of choice, unless there is a specific indication for drainage.

Authorities differ about the use of drainage in border-line cases, without being definite. Some say, "When in doubt, drain." An even larger number say, "When in doubt, do not drain." The use of either expression suggests that there is an acknowledged doubt in regards to drainage in many of these cases, and tends to the acceptance of the fact that there is such a doubt, without trying to determine definitely which cases will do better with drainage, and which will do better without it.

In determining the origin and extent of an abdominal infection, I might call attention to the suction apparatus. The use of this procedure removes the exudate, and thereby not only assists in a curative way, but enables the operator, through inspection, to better judge the case. I would like, however, to mention one element of danger in the use of suction. The suction tube should not be carried from an infected area in the abdomen to other parts which do not show signs of infection. If this caution is not observed, infection may be spread instead of controlled.

Wilensky and Berg claim that the advisability for or against drainage in doubtful cases can be determined by taking smears direct from the infected peritoneal surfaces, and making a hasty examination of them. This is open to criticism because it is hard to estimate the virulence of the infection and the resistance of the patient. It would be a questionable guide, even when the examination was made by a trained bacteriologist.

Drainage of the abdomen principally accomplishes three objects: first, establishment of a sinus down to some one small area; second, production of walling-off adhesions; and, third, relief of abdominal pressure. Drainage, when used, should have for its object one or more of these purposes.

From the results of our work and the reports of the authorities referred to in this paper, we believe that drainage should only be used in those cases which would be benefited by a sinus down to a certain area, in those cases where walling-off adhesions would localize the infection, and in cases of considerable abdominal pressure.

From a clinical standpoint, therefore, drain-

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age would be limited practically to abdomens exhibiting the presence, or symptoms indicating the development of, the following conditions:

1. Necrotic tissue, or localized focus of infection.
2. Intra-abdominal pressure.
3. Exposed extra-peritoneal or oozing spaces.
4. Intra-abdominal abscesses.

From these facts it is evident also that all abdominal conditions, other than those specifically indicating drainage, will give the best results with primary closure.

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CUTANEOUS TESTS IN THE DIAGNOSIS OF SYPHILIS.*

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Cutaneous tests are being used frequently to determine the specific etiology of numerous affections. The causative agents may be bacteria, fungi, protozoa, drugs, and various vegetable or animal products. Jenner was the first to describe cutaneous hypersensitiveness. He noticed that when a person, who had previously had smallpox or cowpox, was vaccinated there soon appeared a local reaction in the form of "cuticular inflammation," and that the vaccination in these cases ended unsuccessfully. It is now known that this phenomenon is related to the individual's specific immunity to the vaccine virus. This hypersensitiveness is allergic or anaphylactic in nature. The cells of the skin share in the general protective processes and thus become sensitized. When the antigen, called allergen, is applied intradermally, a localized shock is produced. The exact mechanism of this reaction is no better understood than allergy in general.

Von Pirquet's discovery that tuberculin gave a specific cutaneous reaction in tuberculosis directed attention to this type of diagnostic procedure in infectious diseases. Tests performed with allergen prepared from the protein of various bacterial and protozoan parasites have given definite and specific reactions. It is not surprising, when one considers the dermophylic tendencies of the treponema pallidum, that soon after its detection cutaneous tests were attempted in the diagnosis of syphilis.

The first attempts to use cutaneous tests for syphilis were made with extracts of tissue containing treponema pallidum. The results were contradictory and not satisfactory.

In 1911 Noguchi[1] proposed the name luetin for an emulsion of pure cultures of treponema pallidum, which he employed for obtaining a skin reaction in syphilis. He concluded that "luetin produces a cutaneous reaction in syphilitic and parasyphilitic patients that is most constant and severe in the tertiary and hereditary affections." It was usually positive in animals which had been inoculated with cultures of treponema pallidum, but it was rarely positive in animals with active syphilis or in early

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stages of human syphilis. The test was positive in a higher percentage of treated cases than in untreated cases, and it was sometimes positive in non-syphilitic patients.

Following the introduction of Noguchi's luetin test, a number of workers reported favorably on its application. Sherrick,[2] in 1915, and Cole and Paryzek[3], in 1917, demonstrated that, following the ingestion of iodides and certain other salts, postive luetin reactions were obtained in non-syphilitics; also that starch and agar would give similar results in patients receiving iodine-containing drugs. Other investigators reported similar results. In spite of the doubt which these facts threw on the specificity of the test, a few continued to use this method in the diagnosis of syphilis. Also, Noguchi[4] recently reiterated his former claim in regard to the reliability of the test.

Kolmer and Greenbaum[5], in 1922, found that luetin and ascites agar yielded reactions in syphilitic subjects of the same kind and degree. They also found that intracutaneous injection of a vaccine of washed treponema pallidum suspended in saline solution did not yield specific allergic reactions.

Recently[6-7], at the University of Virginia Hospital, the work of Kolmer and Greenbaum was repeated and results similar to theirs were obtained. Eighty-five subjects were tested with luetin and luetin control. The test was positive in only 41 per cent of the cases of syphilis, and was positive in 6 per cent of non-syphilitics. The control was positive in 59 per cent of the syphilitics and 31 per cent of the non-syphilitics. The contradictions between the test and diagnosis, between control and diagnosis, and between test and control clearly indicated that the luetin test is not specific and is not a reliable diagnostic procedure.

A series of 139 patients were tested with saline suspension of treponema pallidum free from culture media and also a similar suspension in one-twentieth normal sodium hydroxide. It was thought that dissolving the protein of the organism in the alkali might cause it to produce a specific reaction. The tests were positive in only a small percentage of the syphilitics and a relatively large percentage of false positives were obtained in non-syphilitics.

Another series of twelve syphilitic patients was tested with a defatted vaccine of treponema pallidum. The organisms free of culture media were extracted with toluol before the suspension was prepared. In none of these cases was a positive skin reaction elicited.

The explanation of the negative results in these experiments is either that there is no cutaneous hypersentiveness produced by a syphilitic infection, or that the parasite when grown on culture media loses its allergic producing property.

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THE CHALLENGE OF THE PATIENT WITH CHRONIC DISEASE.*

By R. L. RAIFORD, M. D., Sedley, Va.

In looking through the advertising pages of one of our leading medical journals recently, I was impressed with the number of hospitals and institutions stressing their desire to treat chronic cases, and especially those with a nervous or mental bent. For this there can be only one fundamental reason and that the fact that there are so many of this class of patients needing treatment.

The average doctor is pretty well qualified and equipped for treating acute cases, but his relations towards the old chronic are such as to repel rather than attract. In fact, he just naturally hates to see them come in. Consequently, these unfortunates, being little satisfied with treatment by the legitimate profession, gradually gravitate towards the quack and fakir, and the more blatantly they are promised impossible cures, the more persistently they flock in this direction. They are desperate in their efforts to get relief and are willing to try most anything once and, consequently, they keep up their trying first one worthless cure and then another, enriching the quack but getting little or no real benefit in return for their effort and money.

I feel safe in the statement that the patient practically always seeks aid from his family

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physician first, and it is only when he fails to get relief that he goes to the quack. The quack, furthermore, sees very few acute cases. It is always the old chronic whom we have failed to relieve that enriches his coffers. To "cuss" him out for his ability to attract and get rich out of our failures will never get us anywhere in the solution of this problem. To fight him openly in the courts is often one of his best advertisements. If we ever hope to stop the iniquitous and detestable inroads these charlatans make on legitimate medicine, it must be done by a better and more effectual program in the treatment of our chronic patients.

Many of our leading men are cognizant of this fact, and are urging that we take every possible step to remedy the situation. The following comment in a recent issue of the *Journal of the American Medical Association* shows the need along this line and the trend of our foremost thinkers in working out its solution:

"In the last quarter of a century, the span of life has been lengthened and certain infectious diseases have been eliminated from vast areas. The greatest obstacle now to further progress comprises the group of afflictions generally referred to as chronic disease. Seventy years ago such conditions caused one-fifteenth of the total number of deaths; today they are responsible for one-half of all deaths. Opportunity to observe and study the cause of chronic ailments and to render a much needed service is available in the homes of the incurable and almshouses throughout the country. In a recent study of the leading institutions of this nature, one observer found that the scientific study of disease in such homes is almost ignored. Inmates are looked on in general as beyond rehabilitation. The 1910 census showed that nearly two-thirds of 84,000 paupers in almshouses suffered from physical or mental defects and that the death rate among them was 207.7 per thousand enumerated. This condition apparently did not improve in the next ten years. In New York, in 1921, 67 per cent of nearly 9,000 inmates of almshouses were sick or infirm. The few large institutions that have attempted to rehabilitate their inmates have been handicapped by inadequate appropriations. Some inmates need only custodial care; some need only nursing care; others require the facilities of a well-organized hospital. The individual patient changes from one class to another on account of acute attacks of disease, exacerbations of chronic ailments, or accidents. Obviously, therefore, it is poor management to maintain an institution on the basis that every inmate needs at all times only one kind of care. Boas asserts that buildings designed at minimal expense for those who need a home should be provided, but the main building should be reserved for those who need hospital care and for whom there is hope of rehabilitation. County almshouses cannot be organized in this manner. The counties should pay a proportionate share in the maintenance by the state of large central institutions, which would give better service. The small homes for the incurable and the small almshouse have no place for an independent existence without hospital facilities."

But as important as it is to have proper institutions in which to care for this class of patients, it is far more important that we adopt a more practicable and effectual method of treatment than we have been employing in the past. We must learn to recognize the difference between symptoms and actual disease entities. The secondary condition may and often does need treatment, but little permanent improvement may be expected unless we locate and correct the primary cause of the trouble. It will do little permanent good to treat a digestive or nervous disorder until we correct the tonsil or dental condition causing it. Little real benefit may be expected from the type of pelvic surgery that leaves the original cause of the trouble in the shape of an old infected cervix to continuously spread disease and inflammation to the adjacent organs and throughout the system. The patient with an ailing eye will continue to harass us or our fellow practitioner with urgent requests for relief and restoration of better vision unless we locate and treat properly the old painlessly infected sinus that is causing it. Our neurasthenic or mentally deranged patient may be doomed to a life of bromides, luminal, etc., or to permanent institutional care if we fail to discover and remove the old impacted teeth causing the trouble. It will often be of little or no permanent benefit to treat your cases of constipation along old lines alone and leave a tight sphincter or hemorrhoids or both as an obstruction to the easy emptying of the bowel.

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The scientific study of the motor phenomena of the stomach, the chemical study of its contents or of its digestive capabilities, a cardiographic study of the heart or an elaborate functional test of the kidneys are all most interesting and instructive and more of this type of work should be encouraged. However, it would seem that there is sometimes an inclination after working out elaborate ultra-scientific diagnostic findings of symptoms in a given case to completely ignore the focus of infection that lies back of the origin of this physical disturbance, and let the patient slip by without getting any real and lasting benefit from the exhaustive study that has been made of his case.

We must learn humility of thought to the extent that, just as the expert mechanic will tell you that the smallest piece of trash in the needle valve of the carburetor may put your car completely out of commission, just so may a small focus of disease in the human system give rise to such an annoying chain of symptoms that such a person is rendered unfit for a happy and useful existence. In fact, I believe, that a large per cent of our unrelieved chronic diseases are caused by such trivial things that in themselves seem innocent enough and that are being overlooked by the best men in our profession.

With this idea in view, I have made a very careful and intensive study of a large number of chronic cases and have been more than surprised at the way, for instance, that an old long standing stomach disorder will clear up when the causative infection was located and corrected. In fact, so often and so readily do the most distressing digestive troubles improve from this line of treatment, even after symptoms had persisted for many years, that one is impressed with the conclusion that the stomach, contrary to the usual idea that it is easy to go bad, is in itself a most resistive organ against disease.

These deductions also hold true in the case of children. It is a most common occurrence to see a child who has been subject to repeated and persistent stomach upsets that have been diagnosed everything coming under the heading of stomach diseases, completely clear up after the removal of some bad teeth or tonsils and adenoids, or even small fragments of the latter which had been left over from some former operation.

Some of the best men in our nervous and mental institutions, both private and state, are too prone to class many of these diseases as functional, and relegate the case to a life of hopeless mental imbalance, when a more careful study from the standpoint of some hidden chronic infection would help restore the patient to a self-sustaining and useful life.

The field for the man interested in a better treatment for those suffering with some form of chronic ailment is unlimited. In fact, the world is full of this class of patients.

The challenge for a more beneficial handling of these cases is big enough and difficult enough to engage the best thought of the foremost minds of our profession.

The change in our attitude towards and our treatment of the chronic patient is destined to be revolutionary in its extent during the next few years, and he who fails to hear the call of a better day for these unfortunates must indeed be slow to discard that which is useless in the old method of drug treatment alone and to adopt that which is best in the newer method of looking for and correcting the underlying cause.

A GRAPHIC PRESENTATION OF NUTRITIONAL DISTURBANCES OF INFANCY.*

By SAMUEL NEWMAN, M. D., Danville, Va.

The great mortality and morbidity during infancy are due mainly to nutritional and digestive disturbances. Of every hundred deaths during the first year of life, three-fourths are due directly or indirectly to disturbances centering about the digestive system[1]. The heaviest mortality is among the artificially fed infants.

No chapter in pediatrics is as important and at the same time so difficult as that dealing with nutritional disturbances of infancy. The various and conflicting schools of pediatrics and the lack of a uniform terminology prove a baffling problem to the pediatrician.

In the main there are two systems of classification of nutritional disturbances of the bottle-fed infants. The first system classifies nutritional disturbances on the basis of etiology; the second, on the basis of the

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analysis of the clinical picture, and is essentially a clinical classification.

The etiological classification presents many difficulties. In the first place, it is seldom possible from a study of the case to reason back to the cause of the disturbance. In a majority of cases it takes a combination of causes to produce a clinical entity or complex. In the second place, a definite etiologic factor will cause a nutritional disturbance of varying degrees and stages, each of which will require a different treatment. Hence, treatment is not based on etiology mainly but on the analysis of the clinical condition at hand.

The clinical system of classification of nutritional disturbances of infancy is based on the analysis of the clinical features of the case and it is at once valuable to the practitioner in suggesting the therapeutic procedure. However, the chief difficulty does not lie in the recognition of the various clinical conditions or entities that go to make up the difficult chapter of nutritional disturbances, but in the grasping of their interrelations and transitions from one clinical phase into another. This, as it actually occurs in practice, is through a tortuous course, and is bewildering even to the expert.

In order to clarify this subject, I wish to present briefly the classification of nutritional disturbances by Goepert and Langstein[2], and show graphically the interrelation of the various clinical pictures as we meet them in practice.

Nutritional disturbances in the artificially fed infant present themselves in acute, chronic and mixed forms. In acute forms the picture is dominated by manifestations on the part of the digesive system with more or less participation of the general well-being of the organism. Diarrhea, with or without vomiting, gives the condition a characteristic picture. This we shall designate (for want of a better term) dyspepsia A (Stage II).

The chronic nutritional disturbances are met with in two forms. One form is a condition of non-thriving without any digestive disturbances. Infants in such a condition will appear pale, under-sized and with flabby musculature. The essential feature of this form of disturbance is that there is no tissue waste or loss of weight, but a failure to acquire new tissue at a rate considered normal. This clinical condition is designated hypotrophy, or disturbance of nutritional balance (Stage III).

Another form of chronic nutritional disturbance is a loss of weight of varying degree with the participation of the whole system. In this condition we find changes in the water content of the skin, its tone and color are changed and the temperature regulatory mechanism is impaired, the tendency being to subnormal temperature. The essential feature of this condition, according to Marriot, is an atrophy of the blood. This condition is designated as atrophy, marasmus, athrepsia, pedatrophy, decomposition (Stage V).

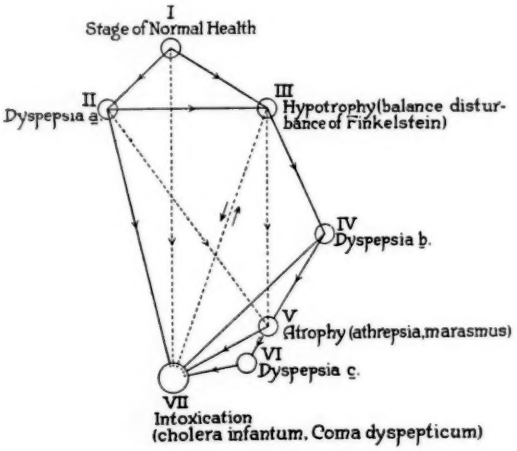
A diarrhea or gastro-intestinal disturbance may befall a child that is in perfect condition of nutrition and development (dyspepsia *a*); one that is in a condition of hypotrophy (dyspepsia *b*); and, finally, one that is in a condition of atrophy (dyspepsia *c*). These three varieties of gastro-intestinal disturbances are to be understood as distinct clinical entities and are to be treated differently. The kind of dyspeptic disturbance we are dealing with is easily divined from the history and examination of the case.

The important clinical picture described in the older literature as *cholera infantum*, but now designated as *acute alimentary intoxication*, is a condition easily brought about through dyspeptic disturbances in atrophic children. The essential features of this condition are a disturbance of water metabolism, rapid loss of weight, heart weakness, and clouded sensorium. The older designation, *cholera infantum*, is inadequate for the reason that not the gastro-intestinal manifestations, such as diarrhea and vomiting, are the main features of the condition, but a vital metabolic disturbance of which diarrhea and vomiting are only some of its manifestations.

We have thus far outlined the various clinical conditions that come under the heading of nutritional disturbances of infancy (bottle-fed). However, the nutritional disturbances are to be conceived of as a unity, and the transition from one condition into another should be clearly visualized. The overwhelming majority of disturbances centering about the gastro-intestinal tract of the infant are not localized conditions but merely manifestations of nutritional disturbances which must be properly designated and viewed in the larger perspective

of nutrition and metabolism. A diagnosis of liver trouble, diarrhea, gastritis, colitis, or even dysentery (unless it be identified bacteriologically) is not a tenable diagnosis in infancy, unless the localized etiologic or pathologic process can be convincingly proved.

This shifting clinical picture of nutritional disturbances of infancy can best be understood as clinical entities, and at the same time as stages of a larger whole or unity, by means of the accompanying diagram[3].



An infant in normal nutritional condition or balance we may conceive of as being in Stage I, or stage of normal health. A normal infant, through a variety of causes, may become acutely ill with gastro-intestinal symptoms, such as vomiting, diarrhea and fever (Stage II, dyspepsia *a*). The same or another etiologic cause may lead to Stage III, hypotrophy. A condition of hypotrophy may also develop in a round-about way by passing through an acute dyspepsia or an intoxication (Stage VII) after either of these conditions have been cured.

The hypotrophic child, because of a continuation of the cause or causes which brought on this condition, or because of additional noxa, may also suffer from a dyspeptic disturbance (Stage IV, dyspepsia *b*). A continuation of the harmful influence or irrational treatment of dyspepsia *b* will usher in the condition of atrophy (Stage V). However, a condition of atrophy (marasmus) may come about without any intervention of dyspeptic disturbances. A child will land into atrophy straight from a condition of hypotrophy. Pylorospasm or pyloric stenosis, for instance, may result in marasmus without any accompanying gastro-intestinal disturbances, the chronic condition of inanition being sufficient to result in atrophy.

In the stage of atrophy the child is very liable to dyspeptic disturbances due to his very low resistance. Such an upset (Stage VI, dyspepsia *c*) in a marantic child is of grave consequence, as it may easily push it down to a condition of intoxication (Stage VII).

Stage VII, intoxication, results most easily from dyspeptic disturbances in atrophic children. In the diagram this fact is represented by a short line. But a condition of intoxication may come about in other ways. The commonest ways will be through the dyspepsias, *a*, *b*, and *c*, *and atrophy*. More rarely a case of intoxication will befall a child in a condition of hypotrophy or even in normal health. During the hot summer spell we may see cases of intoxication even among healthy breast-fed infants. The relative rarity of such possibilities is graphically represented by the dotted lines and their relative length.

In this discussion we limited ourselves to a definition and designation of the various clinical entities that fall into the chapter of nutritional disturbances of infancy in the bottle fed, and to a presentation of their relationships and transitions. Etiology and treatment of these conditions have not been touched upon.

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AN EXCUSE FOR ONLY ONE ATTENDANCE UPON THE MEDICAL SOCIETY OF VIRGINIA IN TWENTY-SEVEN YEARS — GOOD AND BAD YEARS. WILL AN ATHEROMATOUS HEART IN THE FINAL STAGES OF DECOMPENSATION COME BACK? HOW MAY WE PERSUADE IT?*

By A. F. WOOD, M. D., Parksley, Va.

Thinking that I held a record of the poorest attendance in twenty-seven years of membership in this Society—(a record in which I take no pride) and after consuming thirteen years

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(since the meeting I did attend in Lynchburg) in bolstering up my courage to the point where, in September, I decided I ought to attend another meeting before I came into Dr. Osler's age limit, it occurred to me that my plain duty was to face the crowd and give some reason for such a flagrant violation of the ethics of a Virginia physician, viz., to get in every crowd he has a chance to join and talk his head off.

So, having gotten Mrs. Wood's consent to come, under her chaperonage, I sent the title of my talk or paper to our estimable secretary, Miss Edwards. She wrote me that the title was quite long and that members were only allowed twenty minutes to deliver themselves of all they knew on any or all subjects. That information struck me right at home, so I answered, "All right, I can tell all I know about medicine and all foreign subjects in less than five minutes, and the title might be longer than the text." My main excuse is the kaleidoscopic changes in progress of modern therapy.

Many, many times I have prepared papers, several weeks previous to meetings of Medical cal Society of Virginia, on subjects I imagined I knew something about, only to pick up a current journal and to be confronted by a learned discourse on the same subject by a more imaginative physician, which forced upon me the conclusion that I knew less about that particular branch of medicine than any other in the curriculum. There would not be time for writing on another subject; therefore, another meeting would be missed. That, ladies and gentlemen, constitutes my most salient "excuse," as Miss Edwards would put it, although I used the word "reason."

A general practitioner is kept so active in his endeavor to manage the ills of the entire body that he has scant time to concentrate on isolated spots or organs, as has the specialist. The specialist concentrates his fire on a particular and limited sector; the practitioner must cover the entire field of operations.

However, all through my twenty-seven years of variegated practice, I have been scourged with an unending stream of so-called Bright's disease in elderly people; you know the symptoms—kidneys, liver and heart. These cases come in different stages of albumen, casts, liver hypertrophy, and heart dilatation or hypertrophy, and have all been drilled in a meat-free diet, and 95 per cent of them, on such diet, and in spite of medication, gone to the same end —uremia, heart failure, dropsy (drown in their own fluids). In the last twelve years I have been impressed by the great number of such cases on the Eastern Shore of Virginia, where many residents of communities close to water front live on oysters and duck in winter, and crabs, clams, and fish in summer. From childhood they get a too small per cent of other meats, their diet, besides seafood, consisting of vegetables, such as are raised in their gardens, mainly spuds. So I was forced to theorize to myself, and I have called this condition "red meat" or "proteid starvation." The lack of this protied disturbed metabolism and brought about these various symptoms, which progress toward voluntary and involuntary muscular weakness and, finally, relaxation of all vital muscular organs. Acting on this theory, I have fed these cases fresh red meat, contrary to early teaching, and have seen albumen clear up, casts disappear, dropsical effusion absorb, digestive organs go to work normally, and heart murmurs cease. In a word, "back to the constitution" in diet benefits many, and not a few become normal. But, bear in mind, many have developed complications during this muscular destruction, and these cases try our patience and ingenuity.

This brings me to the second part of my title, "Will an Atheromatous Heart in Final Stages of Decompensation Come Back? How May We Persuade It?"

We have all sat by the bedside of some old friend who has gone the inevitable route. Past sixty years, he or she has experienced all the symptoms mentioned before, with hardening of blood vessels, high blood pressure and a legion of other catabolic changes. Then follows a stage of stertorous coma, general relaxation with dropsical effusion, the radial pulse is gone, the vessels of the neck are dilated and engorged, and the patient becomes barrel chested and emphysematous. Our stethoscope fails to recognize the old familiar lubb-dupp in the confused medley of abnormal sounds which constitute the heart's last weakened efforts. Will such a heart come back? We have used various stimulants and tonics, hypodermically and intravenously, without staying the catastrophe; and now, to what plan may we turn with hope?

In my hands, strophanthin, injected into the muscles of the left ventricle, will cause instant

contraction of the entire heart, and, remarkable to state, in less than a minute, the heart valves work smoothly and without a murmur. But, the drug must be injected into the muscle, and not the cavity of the ventricle, for we have already, early in the dilatation, failed through the blood stream. This injection is a trifle difficult, as the heart walls are extremely thin. Briefly, the technique in three cases was as follows: Use a sterilized syringe, with a 1¼ inch needle of small caliber loaded with a solution of strophanthin 1/100 grain from sterile ampoule; a spot over the fourth interspace having been painted with acriflavin, direct the needle obliquely from left to right, aiming to go the longest distance through the heart wall; the point of needle comes out into the cavity of ventricle, indicated by a distinct tremor felt as the barrel lay on inside of the index finger. Do not inject now, but slowly withdraw your needle, and, as you feel a tug at point of needle, indicating the point is within the muscular wall, begin slowly to inject as you gradually withdraw. The muscle may not get the entire dose, but it gets enough, and before you lay the syringe down and get in place your stethoscope (which hangs from your ears), your old friend "Lubb Dupp," has returned.

TUBERCULOSIS OF THE WEIGHT-BEARING JOINTS.*

By R. M. HOOVER, M. D., Roanoke, Va.

The weight-bearing joints are naturally grouped together, because their symptoms and signs are in general very similar, the prognosis is the same, and the principles of treatment are identical.

Before treatment is instituted, a diagnosis is necessary. It has always been difficult to make a definite diagnosis early in the course of the disease, before marked structural changes have occurred in the joint with their increased probability of permanent deformity. Yet in this, more than almost any other pathological condition, an early diagnosis is desirable because of the good prognosis in early cases properly treated, and the danger to life or normal activity in neglected cases.

The ordinarily accepted symptoms and signs of joint tuberculosis are pain, swelling, local heat, atrophy of muscles and bone, muscle spasm, night cries, and afternoon elevation of temperature. These, along with the blood picture, a positive Von Pirquet or intradermal test in children under twelve years of age, and the X-ray picture, have been considered sufficient to warrant a diagnosis of tuberculosis. However, an absolute diagnosis of tuberculosis on these alone is as unjustifiable as a diagnosis of diphtheria without a culture, or typhoid without a Widal or blood culture.

Pain, swelling, heat, atrophy, muscle spasm and loss of function may be present with any joint infection. Temperature and blood picture are inconstant and will not differentiate from other infections. The tuberculin skin tests are of little value unless negative, and, if positive, are useless except in children under twelve. X-ray shows no change early in the disease, the first thing being bone atrophy, followed by hazing, fuzziness of the cartilage outline, and later destruction of cartilage and bone. However, all of these are late in the course of the disease.

Among the pathological processes which affect bones and joints, tuberculosis is, according to Jones and Lovett, the most purely destructive, almost never showing any tendency to bone proliferation. Its reaction of repair is fibrous tissue formation, which eliminates the useful motion of a joint, yet does not give the absolute immobility necessary for the permanent arrest of the disease process. This is seen clearly in a majority of cases of some standing, as they have recurring flare-ups, and are only well when there has been such complete destruction of cartilage as to allow bony ankylosis, usually in bad position. Unfortunately, this process usually takes from six months to many years, and many cases die in the meantime of pulmonary or miliary tuberculosis, tuberculous meningitis, or amyloid disease from long continued suppuration.

It is very essential that an early diagnosis be made, for in tuberculosis the joint must be immobilized; in other conditions, mobilization is essential to maintain joint function.

We have seen that in tuberculosis the disease is only finally arrested by bony ankylosis, so an early ankylosis in good position is the thing to be desired, while in other conditions free motion is the object of treatment. A pyogenic infection should be drained at once before cartilage is destroyed, followed by active and passive motion in order to restore

*Read before the Southwestern Virginia Medical Society, at Mountain Lake, Va., August 27-28, 1925.

good functon. A tuberculous joint should not be drained unless there is mixed infection, and cold abscesses should be treated by rest, or, if they become too large, by aspiration.

A number of conditions so closely simulate this that they are indistinguishable unless one of the following has been done:

1. Demonstration of the organism in material from abscess or abscess-wall.

2. Microscopical examination of tissue removed at operation.

3. Demonstration of the organism by animal inoculation of material removed from the affected joint. A positive diagnosis of tuberculosis can not be made without one of these.

Some years ago it was considered very dangerous to explore a joint, but with present technique and methods of approach, a joint may be explored with just as much propriety as the abdomen, and the leading men in the field, as Dr. Nathaniel Allisson and Dr. Russell Hibbs are advocating exploration in any strongly suggestive case, for only by such means can an absolute diagnosis be made, and treatment be directed intelligently.

The treatment of this condition follows logically the picture of repair. Thirty years ago very radical operations were done with the idea of removing all diseased tissue, but healthy bone was infected in the process, and the results in most cases were poor, if not fatal.

Following this, operative treatment was abandoned, and braces and plaster used with about as poor results.

In recent years, operative procedures have been developed by which ankylosis can be produced in a minimum length of time with a minimum of operative risk. Since ankylosis is the only method of cure in this condition, why not obtain this in the shortest time, with the least risk, and get the patient back into normal active life as quickly as possible?

STATISTICAL STUDY OF DEATHS FOLLOWING PROSTATECTOMY.*

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With a view of ascertaining the relative frequency of the different factors which defeat the genito-urinary surgeon in his endeavors to bring his patient safely through prostatectomy, a search was made for reported cases in which sufficient information was set down to give the data desired. Since single cases are ordinarily reported only because of the rarity of some condition observed and a small number of cases would not be comprehensive enough to show the true incidence of each condition that had occurred, it was thought that only series of at least twenty-five fatalities occurring in the practice of one surgeon should be included in the study. The search brought to light only five articles† adequate for the purpose outlined.

The material includes reports from 1906 to date, practically two decades and a period during which practice in treating prostatism has changed markedly. With the exception of the series reported by Deaver, in which the mode of operation was not stated for the individual case, the reports included only deaths following the supra-pubic operation. So far as could be determined, cases of prostatic carcinoma were not included in the reports.

A compilation of the one hundred and ninety-six fatalities thus reported and a grouping of them according to the relation that the cause given in each bore to the disease and the operation, gave four main headings:

1. A miscellaneous group, comprising twenty-five cases, or 12.75 per cent, in which the cause given bore no definite relation to either disease or operation or was described by so indefinite a term as not to admit of accurate classification. They have been included in the study only so that other causes might not gain undue importance because of their omission.

2. A second group, in which the cause might easily have caused death had no operation been done to relieve the urinary obstruction. This group numbers thirty-one cases, 15.81 per cent, and cannot be charged to the operation. Of this number, eight cases, 4.08 per cent, were due to generalized infection, sepsis or pyemia, and the remainder, twenty-three cases, 11.73 per cent, to infection of some part of the urinary tract. Those set down as due to pyelonephritis, eight cases, 4.08 per cent, have also

*Read before the Medical Society of the District of Columbia, Washington, October 14, 1925.

†Tenny and Chase: **Jour. A. M. A.**, 1906, 46 p., 1429.
Freyer: **Brit. Med. Jour.**, 1912, (2) Oct. 5, 868.
Deaver: **Arch. of Surg.**, 1921, II, 2 (Mar.), 231.
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MacDonald: Cited by Marion, l. c.

been included as though due to renal insufficiency, since persistent or severe kidney infections commonly produce death in that way. Nine cases, 4.59 per cent, in which the location of the urinary infection was not stated, have also been ascribed to renal insufficiency since the reporter, Marion, included the six cases of perivesical infection in his series, and it is reasonable to suppose that, had the cases in question been bladder infections, he would have specified.

3. A third group was due to incidents or accidents occurring during or resulting from the operation. These include thirty-four deaths, or 17.35 per cent. In this group, shock and hemorrhage hold the greatest number—twenty-five cases, or 12.76 per cent. Hemorrhage alone is given as the cause in only a small number—three cases, or 1.53 per cent. Study of the original reports leads to the belief that the reporters were either doubtful as to the extent to which the shock encountered might have been due to the bleeding that had taken place or had disregarded the hemorrhage factor altogether. Tenny and Chase group them together; Marion reports only hemorrhage, while Freyer, MacDonald, and Deaver report shock deaths but none from hemorrhage. It is believed that the figure given for hemorrhage, 1.53 per cent, is much below the actual incidence and that even slight or moderate bleeding may have considerable bearing in producing shock or even more remote complications, such as kidney insufficiency or circulatory embarrassment.

4. The fourth group includes deaths that were set down as due to disease of the kidneys, heart or lungs. While some of these deaths undoubtedly came from deficiencies due to the advanced age at which prostatism occurs, some to the secondary effects of urinary obstruction, some to the operation done, and others to a combination of these, the information at hand is not sufficient to make a satisfactory separation on etiological grounds and they have been grouped according to the organ affected. This group is the largest of the four and comprises one hundred and twenty-three cases, or 62.73 per cent.

In dealing with prostatism, prostatectomy is seldom forced upon us: a very ill patient, even with complete retention, can generally be temporarily relieved by catheterization and, if this is impossible or impracticable, a cystotomy may be done. The patient is usually improved by either of these procedures, but if he does not regain sufficient strength to undergo prostatectomy, life with a suprapubic drain and bag is not unsupportable. Failure to improve after drainage has been established is generally due to irremediable damage of the vital organs.

Since the greatest proportion of prostatectomy deaths come from definite disease of these vital organs, reduction in mortality rates will largely depend upon the accuracy with which their functional capacity can be established. But it is not sufficient to estimate the actual functional capacity; experiments have shown that three-fourths of the kidney substance of an animal may be removed without causing death; it has been estimated that life may be sustained with but one-fifth of the normal aeration area of the lungs functioning and it is a matter of common clinical experience that patients with severe and extensive lesions of the circulatory apparatus may live for a long time only to succumb to some slight strain which would not in the least affect a normal individual. For these reasons, in establishing a prognosis for prostatectomy, it is necessary that the reserve power be accurately estimated. Unfortunately, we have no method by which this can be done and the subject of the experiment survive so that we can only reach an approximate conclusion by analysis of data obtained before operation and a checking up of it with the post-operative result.

Renal insufficiency or uremia accounts for eighty cases, or 40.80 per cent of the whole. Anatomically the only constant feature of this condition is some form or other of destructive kidney lesion. Clinically it serves to account for various symptoms and signs from cramps in the calves of the legs and cold feet to anuria and sudden death; the constant clinical feature is a deficiency in the quantity or quality of the urine excreted. From the viewpoint of pathological physiology, the most constant finding is an increase in the various elements which go to make up the non-protein nitrogen of the blood; yet cases that are anatomically and clinically uremia occur without any change in these constituents, so that, while the cause evidently lies in a kidney lesion, the actual mechanism by which illness and death are

produced is still unknown. The present idea is that it is due to retention of a toxin which makes up a part of the undetermined nitrogen of the blood, but we have no more exact idea than this, as to what this toxin is, whether it is a normal product of metabolism which fails of excretion or whether it is an abnormal one generated quickly just before the development of grievous symptoms. Whatever it may be and whatever its origin the toxin is probably eliminated by the kidneys and, if we are to avoid operative deaths from uremia, the function of the kidney must be carefully estimated and due consideration be given to any deficiency that is found.

The function of the kidney is complex and, despite the hypotheses that have been formulated and the experimental work that has been done, the details are still largely a matter for conjecture. In brief, it subserves five major functions:

1. An important part in the maintainance of the fluid equilibrium of the body.

2. An important part in the maintainance of the salt concentration of the fluids of the body.

3. An important part in the removal of the acid waste products of metabolism, perhaps the most important part in the maintainance of the normal H-ion concentration of the blood.

4. The most important avenue for the removal of the waste products of protein metabolism.

5. The excretion of certain toxic and non-toxic substances when these occur in the blood at all or in excess of a certain amount.

If the fluid or salt equilibrium of the body tissues or fluids is changed, illness marked by the presence of subcutaneous edema quickly results.

Some degree of acidosis probably occurs in all severe kidney disease, but it may occur in the absence of any kidney lesion; and the measurable margins between the normal and absolutely fatal limits of it are too narrow and may be too quickly traversed for its measurement to be taken as a test of kidney function.

Estimation of kidney function by measuring the products normally excreted in the urine is not a satisfactory method because it can give only an idea of the material removed and leaves us in ignorance of the amounts retained. Clinical study of the retention of the end products of nitrogenous metabolism has been practicable for only a short time and has been made possible by simplification of the technique of estimation by Myers, Marshall, Folin and others since 1910.

Without reviewing in detail the work that has been done, our present view is that the non-protein nitrogen of the blood comprises an excretory portion consisting of urea, uric acid, creatinin, creatine and ammonia, an intermediate portion made up of amino acids and an undetermined portion which is computed by subtraction.

Study of kidney disease on the basis of blood nitrogen retention indicates that there are two types of nephritis with such retention,—the nephritic, in which the retained urea is more than 50 per cent of the total non-protein nitrogen, and the toxemic, which is well illustrated by the findings in eclampsia, in which the urea is less than one-half of the non-protein nitrogen content. Clinical experience indicates that for practical purposes the determination of the urea rátio is as satisfactory as the more laborious and detailed estimation of the other elements which make up the non-protein nitrogen and that, if the urea content is not markedly increased and represents more than one-half of the non-protein nitrogen, the toxic element is low enough to be considered normal.

Following the course of prostatism by blood nitrogen studies, it is learned that the nitrogen content is ordinarily high but that after the back pressure has been relieved and the diet and hygiene of the patient regulated, it sinks to a point the absolute level of which depends upon the amount of permanent damage that the kidneys have sustained.

Myers (*Jour. A. M. A.*, Oct., 1922, 79, 17, p. 1,386) states that with a blood urea nitrogen of below twenty milligrams per hundred cubic centimeters of blood, the renal factor may be disregarded. With retention up to twenty-five milligrams, operation should be undertaken with considerable caution, and if it is above that amount, only after considerable treatment.

Estimation of kidney function by the measurement of the various toxic and non-toxic substances excreted in the urine has attracted many workers; thus, the phloridzin test was used for a while and was followed by the use

of different dyes. The acme of this method has been reached in the phenolsulphonephthalein test, the use of which is almost universal, although methods of interpretation differ. Definite figures as to the lower limits at which operation is safe are seldom given; custom is to require an elimination of over 20 per cent for two hours following injection, either intravenous or intramuscular, of six milligrams of the drug. The amount excreted during the first hour should be greater than that returned during the second and the test should be repeated with approximately the same result several days apart.

Diseases of the lung, mainly pneumonia and broncho-pneumonia, account for the next highest number of organic deaths—twenty-three, or 11.72 per cent. Apart from a careful physical examination which ordinarily indicates only actual disease, nothing can be done to estimate what the performance of the lungs will be under the stress of anesthesia and operation. The effects of lung lesions are generally felt in other organs, principally the heart and the lesions encountered are mainly infectious, so that knowledge of their functional capacity is not so important as it is in other organs. Adequate nursing and operating-room care, with careful inhalation anesthesia for as brief a time as is practicable, will do much to minimize the lung hazard. Many of us believe that spinal and regional anesthesia lessen the lung hazard and are superior to inhalation anesthesia for other reasons.

Heart deaths account for twenty cases, or 10.20 per cent of the fatalities studied. In elderly men, the heart and kidneys are frequently damaged simultaneously, so that it is rather surprising that a larger number have not been set down as due to heart disease. Only one of the reporters (Deaver, in four cases) uses the term myocarditis to describe the cause of his heart deaths. It is reasonable to suppose that others were due to this little appreciated form of cardiac disease. The expression of the cardiovascular power in a single figure for operative prognosis seems to have been accomplished by Moots (Moots, C. W., *Interstate Med. Jour.*, 1916, 23, p. 887). He applied the rule devised by Stone (Stone, W. J., *Jour. A. M. A.*, Oct. 4, 1913, 61, 14, p. 1,256) for determining the relation between the work done by the cardiac muscle and the potential energy stored in the arterial walls and the column of blood that they contain to his surgical cases. This factor is obtained by reducing the diastolic pressure as compared with the pulse pressure to terms of percentage. Patients with a factor between twenty-five and seventy-five are probably operable,—outside these limits, probably inoperable. Of one thousand cases checked up by this rule by Miller (*Boston Med. & Surg. Jour.*, Jan. 2, 1919, 180, 1), 3.23 per cent of the operable and 23.07 per cent of the inoperable died. To his report, Miller appends the following note: "Some of the cases classed as inoperable underwent minor operations safely and some of those classed as operable died after very serious operations, but under circumstances which could not have been readily predicted." This rule has been further modified for major operations by Dr. Frank Duehring, who brought it to my attention. According to his experience, factors between thirty-five and sixty-five are good risks; between twenty-five and thirty-five, and between sixty-five and seventy-five poor risks, while below twenty-five and above seventy-five are almost certain fatalities.

	Normal		Nephritic		Toxemic	
	Mg. per 100 cc	Per cent	Mg. per 100 c.c.	Per cent	Mg. per 100 c.c.	Per cent
Urea	12	40	100	71.0	16.0	32
Uric Acid	3	10	15	10.8	8.3	16
Creatinin	1	3.3	13	9.4	1.8	4
Amino Acids	6	20	4	2.9	6.0	12
Rest Nitrogen	8	26.6	8	5.8	18.0	36
Non-protein Nitrogen	30	99.9	140	99.9	50.1	100

	Cases	Per cent
I. *Miscellaneous*:		
Progressive cachexia	7	3.57
Progressive weakness	3	1.53
Asthenia	3	1.53
Mania	2	1.02
Cancer of liver	2	1.02
Cerebral hemorrhage	2	1.02
Cachexia	1	.51
Collapse	1	.51
Acute pancreatitis	1	.51
Heat stroke	1	.51
Meningitis	1	.51
Gastroenteritis	1	.51
Total miscellaneous	25	12.75

	Cases	Per cent
II. *Incident to Prostatism*:		
Urinary infection:		
Location not stated	9	4.59
Pyelonephritis	8	4.08
Perivesical	6	3.06
Total urinary infection	23	11.73
Sepsis and pyemia	8	4.08
Total incident to prostatism	31	15.81
III. *Operative Incidents or Accidents*:		
Shock	14	7.14
Shock and hemorrhage	8	4.08
Hemorrhage	3	1.53
Total shock & hemorrhage	25	12.76
Embolism	5	2.55
Peritonitis	3	1.53
Anesthesia	1	.51
Total operative	34	17.35
IV. *Organic Diseases*:		
Kidney. Uremia, anuria or renal insufficiency	63	32.13
Pyelonephritis	17	8.67
Total kidney	80	40.80
Lung. Bronchitis, pneumonia, broncho-pneumonia or not stated	23	11.73
Heart. Heart disease, cardiac lesion, myocarditis or not stated	20	10.20
Total organic	123	62.73

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PRESENT STATUS OF ANTILUETIC TREATMENT.*

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Ehrlich's chemoceptor and side-chain theory still holds good in the determination of the therapeutic applicability of drugs. In other words, the ratio between the parasitotropy, and organotropy proportion, determines the safety index of drugs. So it is important to bear this in mind in the selection of arsenicals, and to have a fixed mental attitude as to the object sought, together with a definite knowledge of the relative efficacy of the different forms.

It is possible to discuss but briefly the antiluetic drugs now available. To preface these remarks, it should be stated that at present no single drug is at our disposal that will dispense with the others. Intramuscular injection of mercury finds preference in the hands of the largest dispensers of this drug. Physiologically, it seems preferable to use the soluble form of mercury, prepared in a suitable manner to eliminate pain to the greatest degree. The salicylates and benzoates find application in the hands of those who prefer the insoluble salts of mercury.

At the present time bismuth is receiving considerable attention among syphilologists and many very satisfactory reports have appeared, darkened by the usual bismuth forms of acute intoxication, such as convulsions, dyspnea, lassitude, albuminuria, and ulcerative stomatitis.

Bismuth preparations may probably find a place in antiluetic therapy, replacing mercury in some instances where the patient has shown a drug fastness or possibly an intolerance to mercury medication. Bismuth has the advantage of possessing both acid and basic properties, thereby adapting it to cases where there is need for an amphoteric condition.

There are three distinct types of bismuth compounds available. Bismuth quinine iodide, bismuth oxybenzoate, and the alkali salts of tartrobismuthate comprise the group now being utilized.

Bismuth is entirely too toxic for intravenous use, and finds application only in intramuscular therapy. Oily suspensions of the soluble and the insoluble tartrobismuthates have been used, but in most instances they have been accompanied by considerable pain.

Bismuth alone, like mercury, shows practically no trypanocidal activity in sublethal doses, as pointed out by Myers and Corbitt (1923).

In the fields of arsenicals a much greater variety of research has been carried out. Ehrlich's "606," salvarsan, or, in official terms, arsphenamine, without doubt continues to be the most potent drug in the series. To this group has been added a variety of neoarsphenamines differing from the original in physical, chemical and therapeutic characteristics.

If only one drug were available, I believe that I would select salvarsan, or silver salvarsan, as the most satisfactory from the point of view of clearing up lesions, causing the disappearance of organisms and giving an ultimate serological result that would be satisfactory to the clinician as well as to the patient. Of all the drugs available, salvarsan and silver salvarsan are the most potent. This is proved by the fact that these two drugs show the most satisfactory ratio from the point

*Read before the Ex-Internes Association of St. Elizabeth's Hospital.

of view of the trypanosome test. This is a fairly good means of evaluating these drugs in a comparative manner. I am making this statement notwithstanding some of the commercialized advertising literature that is available, but I defy any academic investigator to confirm the alleged potency of neoarsphenamine when it is tried out according to the methods employed by the U. S. Public Health Service. From a toxicological point of view, salvarsan will pass a test on white rats at about 200 mg. per kilo. The present clinical application is about 400 mg. per 60 kilo patient, or about 6 mg. per kilo. Therefore, you see that the safety margin is the ratio 6:200 or approximately 1:30.

In the case of salvarsan or arsphenamine, careful technique in the preparation of the solution must be carried out, otherwise reactions will result. There are three prime factors that must be considered in intravenous injection:

1. Concentration of the solution.
2. Alkalinity of the solution.
3. The rate of injection.

Salvarsan does not act quite as quickly as silver salvarsan in clearing up lesions, but it produces a more uniform action, together with an exceptional serological effect.

If at the present time we could depend upon the doctor to give the proper amount of time and consideration to the patient, the use of salvarsan would undoubtedly supersede the use of all other drugs, but unfortunately the doctor of the present day is looking for a "short method" of treating the patient, giving no consideration to the physiological action and the future results that should be expected in the treatment of syphilis. You will find many instances in which general practitioners are employing intramuscular arsenical treatment because they find that it is an easy way to carry out the task which really should be given more consideration.

You are well aware that arsenic acts particularly upon the organisms which are in the blood vessels and, therefore, in order to obtain an abortive treatment before a too great invasion of spirochetes has taken place, intravenous use of the drug is more desirable. In this way the organisms come directly in contact with the dynamic drug used for this purpose. From a serological point of view I believe there is no drug superior to salvarsan, but, as I have pointed out earlier, it is necessary to administer the drug in the proper manner or difficulties will arise. You would be surprised to learn of the large number of men who forget to add alkali to the solution and give the patient an acid solution of salvarsan, in many instances resulting in death.

In discussing salvarsan, there is one other precaution that should be noted, namely, that during the early stages of the disease the drug should be administered frequently. Therefore, it is believed advisable to give a 0.4 gm. dose of salvarsan every other day for three to five injections, so that a maximum saturation of the tissues and the blood stream may be obtained. Too frequently the mistake is made of delaying the administration of the drug, and also many times the injections are given a week or two weeks apart. This is unsatisfactory in the primary and early secondary stages.

Silvar salvarsan will undoubtedly produce the same effects as salvarsan, except that the serology, dose for dose, will not be quite as good. In other words, if you have a patient with mucous patches or e a r l y secondary lesions, such as cutaneous manifestations, you can remove these conditions more rapidly with silver salvarsan than with any other drug now available. From a social point of view this is extremely important because your patient can be rendered noninfective in a very short time. Actual dark field examinations have shown that the organisms disappear from the lesions quickly. Silver salvarsan is extremely valuable in cases where a drug fastness has developed. It has been shown by a fairly large group of individuals that in these old cases of drug fast syphilis, the employment of silver salvarsan has produced remarkable serological effects, changing positive serums to negative and keeping them so for periods of one and two years.

Silver salvarsan from a toxicological point of view is tolerated in doses of 200 to 250 mg. per kilo, and its trypanosome action is about twice that of salvarsan. Hence, the use of a smaller dosage is possible in the case of silver salvarsan.

The use of neosalvarsan is indicated in cases where the patient does not tolerate salvarsan well. We know that there are certain

individuals who show a marked tendency toward intoxication of the autonomic nervous system, and in that type of case it is suggested that neosalvarsan be tried. Futhermore, neosalvarsan possesses the advantage of convenience of administration in that product is already nearly neutral.

Neosalvarsan is well tolerated by most patients. It has a low toxicity in keeping with a high therapeutic activity. I think that it is fully established that neosalvarsan corresponds very well with the high ideals suggested by Paul Ehrlich in his original investigations in chemotherapy.

It is noted for the fact that it is almost entirely a mono-substituted product, thereby possessing a higher therapeutic activity than those products which are di-substituted or contain a large quantity of sulpharsphenamine as an impurity. Please understand that all neoarsphenamines are not the same in regard to toxicity or therapeutic activity and that there is a marked difference in the uniformity of the products.

Sulpharsphenamine is a modification of neosalvarsan which was tried out by Paul Ehrlich in 1912 and for some reason or other dropped by him at that time. It was later revived by the French under the name of sulfarsenol. More recently some American investigators have re-discovered these results and some agitation in its favor has been advanced. Sulpharsphenamine is two and one-half times less active than neosalvarsan. This statement is made irrespective of who may manufacture the sulpharsphenamine. It has the very unfavorable property of producing anemia and also a hemorrhagica purpura with a profuse bleeding from the mucous membrane surfaces. This bleeding cannot be stopped even by the use of thromboplastin.

As far as I am aware there is no real excuse for the use of sulpharsphenamine, and personally I regard the dangers as extremely great in its use. Its toxicity is about the same as that of neosalvarsan; its therapeutic activity, as I have stated above, is two and one-half times less than neosalvarsan. The responses of the Wassermann and the cutaneous lesions are not as good as those from arsphenamine.

Tryparsamide represents a pentavalent type of arsenical. It is excreted rapidly and almost entirely by the kidney. Ninety per cent of it may be recovered from the urine unchanged during the first twenty-four hours. Its penetrability into the central nervous system is very slow. It has no spirocheticidal action. During the first few weeks after its application there is a remarkable improvement in the physical condition of the patients, but its later effects, according to the observations made by excellent investigators are not so good. It undoubtedly has a very definite use in the treatment of human trypanosomiasis. Its value in the treatment of neuro-syphilis cannot be definitely stated at the present time because careful observers realize that no statements can be made about drugs in the treatment of neurosyphilis inside of five years of actual and continuous observation.

In your interpretation of the statements made above in regard to the various drugs, please do not overlook the fact that I am referring to uncomplicated conditions of syphilis. If we have aortic lues to deal with or a very sudden involvement of the central nervous system which has taken place only a few months after the primary infection, various modifications in the treatment must be made, and in all of the statements that I am making, I have certain mental reservations in regard to modifications in the manner in which these drugs may be used. I am just making this statement because there are always certain exceptions which come up in the treatment of syphilis in which the course of treatment is not one of routine. In fact, as you have undoubtedly long ago realized, the treatment of syphilis is one of individualization, and whenever a firm and fast rule is laid down, some of the patients suffer as a result of this scheme.

REFERENCE.

C. N. Meyers, Personal Communication.

ELECTRO-THERAPY AS AN EXACT SCIENCE.*

By C. E. BOWLES, M. D., Pulaski, Va.

The treatment of disease of the human body with electricity has for a long time absorbed the attention of some of our leading men, yet I, like most medical practitioners, have looked upon it with much skepticism and incredibility, often attributing the favorable results obtained to its psychological effect or the kind assistance of Nature. However, after considerable

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study and research, I became profoundly impressed with the sound scientific principles underlying electrical phenomena and especially those occurring as a result of its application to the body tissues. So firmly convinced did I become, that I had an electrical equipment installed in my office for experimental purposes; and it is now my desire to make known to you the methods used and the results obtained.

Like most of us with a new toy, I began trying it on everything, and was much discouraged to find that only occasionally did I apparently get any beneficial results, although I followed the technique of some very able men. I then set about to find the cause of my failures, which were more real than apparent, and much to my surprise, it became evident that I was working in the dark, so to speak. I was simply applying first one current and then another, and allowing them to flow from five to twenty minutes, according to directions, without having the faintest ideas as to what I expected it to do. I was using the old shot-gun prescription, and destroying that which I had hoped to cure. I then worked out a chart by which I could ascertain the current to be used for a definite result, and a formula to determine the actual measurements of the work being done, whether mechanical, thermal or chemical.

I found the high frequency machine to be fitted with a milliampere meter, which simply informs us of the amount of current flowing, while ignoring two very valuable qualities of the current—the voltage and the resistance met in its passage through the tissues. No volt meter having been devised which is practical for high frequency, it was necessary for me to find this quality with a Wheatstone bridge, or a galvanic current with a volt- and ampere-meter in circuit. With either of these machines, I was able to find the body tissue resistance, but with the galvanic current it was necessary to apply Ohms law. According to this law, the current is directly proportional to the voltage, and inversely proportional to the resistance; therefore, by dividing the voltmeter reading by the ampere-meter reading, we arrive at the resistance. Then, by applying the high frequency current to the tissue of known resistance and multiplying the known resistance by the milliampere reading of the high frequency current in fractions of the ampere, I was able to find the high frequency voltage. This gave me accurate measurement of the current in amperes, of the pressure in voltage, and of the tissue resistance in Ohms.

My next problem was to determine what I desired the current to do, for electric energy is capable of being transformed in three ways: thermal, mechanical or chemical. Every current has these three qualities, but any one or two of them may be intensified at the expense of the other by following definite electro-magnetic laws. This is done in the various makes of electric machines, which deliver a definite current at the electrodes, but if any one of the conditions, voltage or resistance, be changed, as in applying the electrodes to the body, the amount of current flow is also changed and the effect of the current is modified as to its thermal, mechanical or chemical action. This feature probably accounts for much of the skepticism among physicians who are not well-grounded in the fundamental laws of physics.

There are two principal currents, alternating and direct, both of which are capable of many modifications, each accomplishing a definite result. The alternating current flows first one way and then reverses, with each make and break of the current, and, therefore, has practically no chemical effect of its own.

The high frequency is a alternating current, with from 60,000 oscillations per second up. The oscillations are so rapid that the muscle can not respond to each oscillation. It produces, therefore, a cellular bombardment, with mechanical work of a molecular nature, and also sets up heat waves. The D'Arsonval, or bipolar high frequency, is so arranged that these effects may be modified, the effect varying from intense molecular work to intense heat production. This current has practically no chemical effect of its own, although chemical reactions in the tissues probably occur as a result of the increased cellular temperature.

The Tesla is a high frequency current with a very high voltage and medium amperage, while the Oudin has an extremely high voltage and very low amperage. These two currents have very little heating effect, and their principal action is cellular bombardment and molecular mechanical work, although the reverse is true when the resistance is lowered and the voltage is greatly increased. The modified effect, due to changes in amperage, voltage and resistance, is true of both the alternating and direct currents. The direct, con-

tinuous, or galvanic current, is of low tension, and flows only in one direction, that is, the positive flows one way and the negative in the opposite direction. Therefore, the chemical constituents of the electrodes are driven into the tissues and produce anabolic or katabolic changes. This current has marked polarity and, if suddenly switched on or off, produces mechanical work in the form of muscular contractions.

J. J. Thompson, in his series of investigations of the cathode discharge, was able to make measurements of the ratio of the electric charge to the mass of particles of matter projected from the cathode, and to show that this electric charge was identical with the atomic electric charge carried by the hydrogen atom in the act of electrolysis, but that the mass of the cathode particles was only one two-thousands part of the mass of the hydrogen atom; and Prof. J. Larmon has shown the chemical atoms to be collections of positive and negative electrons. This has been sustained by many others, and the experiments of Madam Curie seem to settle the matter. She found the radium radiations to consist of three kinds—alpha, beta and gamma—the alpha rays being positive, the beta rays negative, and the gamma rays neither positive or negative and therefore neutral.

The force of these experiments has caused us to look upon electricity as a collective name for electrons in flow, which in turn must be considered as constituents of the chemical atoms. This point was given particular emphasis by me at the Roanoke meeting of the State Society. It brings us to a consciousness of the fact that, since atoms of matter are composed of congeries of electrons, the inertia of matter means the inertia of the electro-magnetic media, and the operation of the electric current consist of a diffusion or movement of these electrons through matter, and is controlled by the laws of diffusion, which are similar to those of diffusion of liquids and gasses. This is particularly true in using the direct current, but another important factor comes into prominence in using the alternating current, for, whenever the electrons or current are accelerated or retarded, that is, whenever the velocity of the electron is changed, electric or heat waves are produced. Heat being one of the forms of motion, as the heating effect increases, the mechanical work decreases, but the more resistance that is met, the more is the mechanical work done relatively increased and the heat diminished. These facts are sustained by the experiments of Hermann, Raymond and Sanderson, and are applicable to the alternating current, of which there are many varieties, as the Tesla, Oudin, diathermy, sinusoidal, etc., each varying in its proportion of thermal, mechanical and chemical action. These same phenomena occur when the direct or galvanic current is used, but when used as a continuous current of medium voltage, its effect is almost purely chemical. This being the case, we find that tiny particles, or electrons, are projected from both electrodes and diffused into the tissues. From experiments, we know that this diffusion is not only intercellular but intracellular as well, so that chemicals are actually driven into the cell protoplasm, from which they may be recovered. Thus, the positive pole is used to introduce the metal ions and bases, while the negative pole introduces acid radicals and the halogens, in conformity to the magnetic law of attraction and repulsion. Wm. Morton, Benton Massie, Sir Lewis Jones and R. W. MacKenna have recorded some very interesting experiments along this line, the principal conclusion being that foreign ions are diffused into the body tissues in direct proportion to the milliamperage of the current and the time of its flow.

Massie, in Practical Electro-Therapeutics and Diathermy, gives a long list of the quantity of ions diffused by a given current and the relative velocity of the ions, of which I shall mention only two. He shows that the an-ion chlorine and cat-ion potassium both have a relative velocity of one, and flow into the tissues at the rate of practically 0.4 milligrams per coulomb of current. A coulomb is the measure of one ampere of current flowing for one second. The an-ion iodine has a velocity one-half faster than the cat-ion mercury, yet both flow into the tissues at the rate of practically 1.2 milligrams per coulomb of current. As a practical illustration, suppose we apply a continous or galvanic current of ½ ampere, with a pressure of 10 volts, and allow the current to flow for five minutes or 300 seconds, using a solution of potassium chloride as the electrodes. This would be 150 coulombs of current, which, multiplied by the

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0.4 milligrams of potassium and chlorine, would show that 60 grams each had been injected into the tissues, while the same current would inject 180 grams each of iodine and mercury. Since these chemicals are diffused into the cell protoplasm, it is evident that the local effect would be more rapid and powerful and the systemic effect greatly prolonged. I have found this true in the application of cocaine and silver solutions to the nose and throat. Cocaine is diffused at the rate of 3. milligrams per coulomb of current and penetrates to a depth of 2 millimeters in five minutes, according to Leduc, while silver is injected at the rate of 1.1 milligrams per coulomb of current and penetrates to the same depth, in granulation tissue the penetration being much greater.

It may be of interest to side-track for a moment and apply this to our food values in calories. The human organism requires 2,281,400 calories of heat every twenty-four hours to maintain equilibrium. Of this, the intake consists, according to Kirke, of protein 400,000 calories, fats 906,900 calories, and carbohydrates 974,500. To furnish this electrically would require 814,385 calories of carbon, 481,798 calories of oxygen, 1,014,045 calories of hydrogen, 64,000 calories of nitrogen, and 4,000 calories of sulphur. This would require three daily applications, as follows: carbon 66 minutes, hydrogen 96 minutes, oxygen 62 minutes, etc. This does not concern us so much at this time, and is only mentioned as a possible therapeutic measure to be utilized in the future in maintaining body equilibrium where the normal digestive functions are in abeyance, but it does illustrate the mathematical exactness as applied to the direct current. The work of Prof. Baly, Heilbron, and Dr. Coward with the ultraviolet ray leads to the conclusion that the carbohydrates and protein, as well as the vitamines, are a result of the chlorophyl or carotin being built up into formaldehyde and later into these substances, through the chemical action of the ultraviolet ray, and, since the action of the ultraviolet ray and the electric current are identical from a chemical standpoint, it is evident that a consideration of the individual part to be treated is necessary before we can know the chemical reactions taking place in the tissues, for the chemical ions injected would react with the chemicals of the tissue in accordance with definite electro-chemical laws. This particular phase exposes our ignorance of the chemical composition of man, but, from what we do know, fair calculations may be made and will at least be as accurate as the administration of drugs by mouth or hypodermically. We know that the carbohydrates, fats and their derivatives are composed of carbon, hydrogen and oxygen and that from 76 to 84 per cent of protein is carbon, hydrogen and oxygen, leaving from 16 to 24 per cent of the protein to be formed by nitrogen, sulphur, sodium, potassium, iron, chlorine, etc. We have reason, therefore, to believe that the C H O groups are responsible for most of the reactions, especially in the incipient stage. Of these, the elements of the lowest atomic weight, as hydrogen and oxygen, are probably most affected by the current. According to Thompson, the only difference between the elements is the number of atoms and electrons, and, as he has shown, the electron is ony 1/2000 part of the hydrogen atom, while the oxygen atom has been found to contain 32,000 electrons. From this it is evident that, if we can inject 30,000 additional electrons into the hydrogen atom, the result will be oxygen. We would then have an excess of oxygen in the tissue, which would react with hydrogen to form water, and with carbon to form carbonic acid. While this is a speculative reaction, yet we do know that sweating under the cathode is the rule, and that muscle tissue can be made to react and produce oxidation products, like carbonic acid, in at atmosphere containing no oxygen. Oxygen is not free in muscle tissue, but enters into a complex hypothetical compound called inogen. On the muscle contracting, this is broken up into carbonic acid, sacro-lactic acid, and a protein called myosin. It would seem that this knowledge makes our electrical calculations fairly accurate as to the chemical changes occurring in the tissues, while it also helps to explain its action on uric acid deposits. The formula of uric acid being $C_5 H_4 N_4 O_3$, on having one hydrogen atom converted into oxygen, and taking up one sodium atom, it becomes $C_5 H_3 Na N_4 O_3$ or acid sodium urate, in which form it is excreted in the urine. We would naturally expect different results from tissues of different chemical composition, many of

which will be known only after careful analysis.

The Alternating or High Frequency Current.

Time will not permit me to go into this type of current very fully, but the type of current desired can be readily selected from the electrical chart, and one example will demonstrate the accuracy with which it may be applied. This is a variable current, with from 60,000 oscillations per second up, and has practically no chemical effect of its own, although chemical tissue changes take place as a result of the increased cellular temperature. If we apply this current to a body of 800 ohms resistance and let ½ ampere flow for five minutes or 300 seconds, with a pressure of 400 volts, our result will be quite different. There is no chemical effect, its action being of a molecular mechanical nature and heat production. In order to measure this, we multiply the voltage 400 by the ½ ampere and this by the 300 seconds, which gives us 60,000 joules of molecular mechanical work done. Then to find the amount of heat produced in the tissues, we multiply this product by .24, as this is the heat equivalent of joules in calories, and we find that 14,400 calories of heat is produced in the tissues. As before stated, any change in one or two qualities of the current modifies its effect, and as the resistance decreases, the heat increases. Suppose, now, we apply the same current to the wrist of 100 ohms resistance; then, to find the amount of current flowing, with a given pressure of 400 volts, we divide the resistance into the voltage, which gives us 4 amperes. This would produce considerable destruction of the tissues. The resistance having been decreased, the mechanical work necessary to overcome this is decreased, while the heat is increased, so it becomes necessary for us to reduce the current. The amperage being directly proportional to the voltage and inversely proportional to the resistance, it is necessary either to reduce the voltage or increase the resistance by artificial means.

Most electric machines have a fixed voltage, and it is necessary, therefore, for us to add additional resistance in the form of wire coils, in order to have the same amperage. This is readily accomplished with the Wheatstone bridge, which contains coils of definite resistance, usually of 10, 100 and 1,000 ohms resistance, etc. The results obtained in following this technic have been very gratifying to me, and it seems evident that its therapeutic value in the treatment of disease is not only practical, but accurate and scientific, when administered by those well-grounded in the fundamental sciences.

Case Reports.

No. 1.—This consists of nine cases of acute dacryocystitis of from two days to three weeks' standing, about one-third of them having received previous treatment from their physicians. The symptoms varied from mild inflammation in the region of the tear sac to marked inflammatory involvement of the lids and conjuctiva. Treatment consisted of cellular bombardment and molecular massage with cathode rays, using the Soule eye vacuum electrode once daily for four days.

Results: In four cases the inflammatory symptoms were relieved in twenty-four hours, at which time there was every appearance of a normal condition. Three more treatments were given, and argyrol dropped into the eye passed readily into the inferior meatus. Four weeks later, one of these cases returned, and I found the tear sac greatly distended but not tender. Another treatment was given and patient returned the next day apparently normal. I gave him four more treatments. The other cases responded after four treatments.

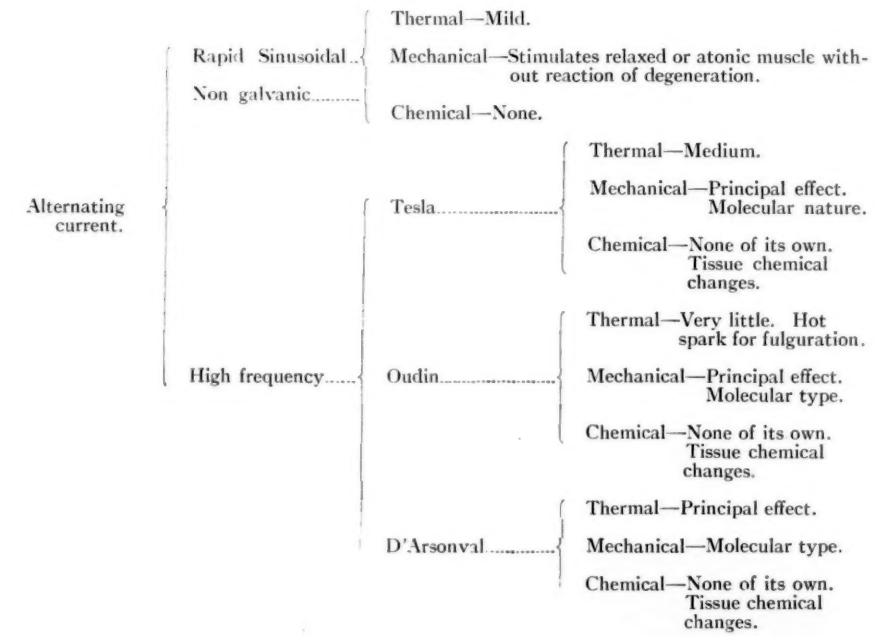
No. 2. Mrs. —, age twenty-six, was a case of chronic lacunar tonsillitis, preceded by an acute attack of three weeks' duration. Referred to me by Dr. G., who had been treating her. The symptoms complained of by the patient were severe sore throat and great pain on swallowing. Her voice was husky and even speaking caused considerable pain. I found the tonsils full of ulcers and almost touching. There were about fifty sores on her face, arms and body, about the size of my little finger nail. She had lost considerable weight and was down and out. Treatment consisted of fulguration with a 10 m.m. spark every third day for three treatments, a copper electrode being used. A fourth treatment was

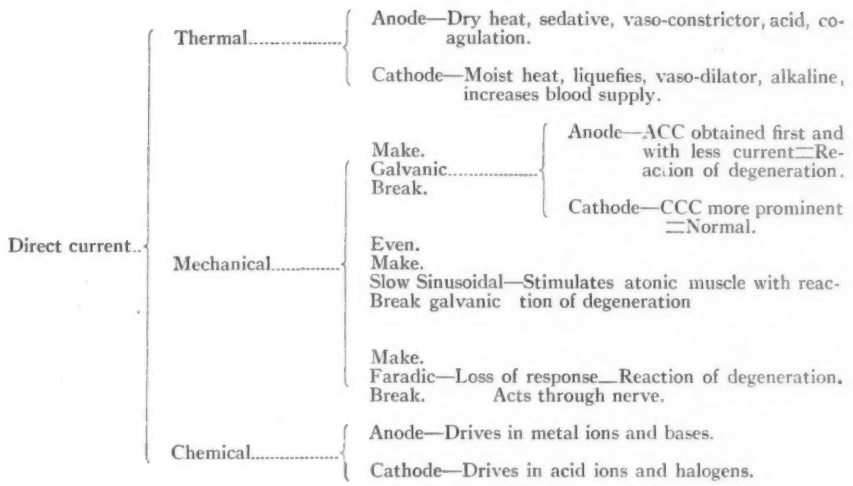
given after the lapse of one week. S. F. I. mixture was also administered three times daily.

Results: At the end of sixteen days, patient had gained fifteen pounds and said she never felt better. There had been no discomfort from treatments, although the tonsils were reduced to the size of a small lima bean. One almost disappeared. There was nothing abnormal left, except some adhesion to the pillows. Every sore had disappeared.

No. 3. Mr. U— was referred to me by Dr. W., a dentist, for antrum trouble. For two years he had been suffering with pain in the region of the left antrum. He had not been free from pain during this time, although at times it was no worse than a mild toothache. His teeth from the lateral incisor back had been removed but pain continued. I found no trouble with the antrum, transillumination showing clear. A diagnosis of trifacial neuralgia, involving the maxillary branch, was made. and later sustained by two physicians. I advised alchohol injections or operation, but he was not inclined to follow this advice. I then suggested we might experiment with the current, to which he readily agreed. Molecular massage to the extent of 6,000 joules, together with 1,440 calories of heat was used, and eight treatments were given before absolute relief was obtained, although he reported considerable improvement after each treatment. Two months later he returned with pain in the lower jaw, after having had all lower teeth on that side removed without relief. I followed the same treatment I had formerly used, with the same results, but gave him twelve treatments this time. Since then he has taken several treatments at varying intervals, but has had no return of the trouble. Six months have elapsed since his last attack. I do not report this as a cure, for it may return, but simply give it to you for what it is worth. The fact that he obtained this amount of relief, after suffering continually for two years, certainly makes it worth while.

ELECTRICAL CHART





ELECTRICAL RULES AND FORMULAE.

1st. Changing the resistance changes the voltage or amperage.

2nd. Amperage is directly proportional to the voltage and inversely proportional to the resistance (Ohm's law).

3rd. Mechanical work decreases as the heating effect increases.

4th. Voltage is usually a fixed quality.

5th. Body resistance is a fixed quality in each portion.

6th. Amperage is controlled by voltage and resistance.

FORMULA.

$$\text{Amperage} = \frac{\text{Volt}}{\text{Resistance.}} \qquad \text{Resistance} = \frac{\text{Volts}}{\text{Amperage}}$$

$$\text{Volts} = \textit{Amperage} \times \textit{Resistance}$$

TABLE.

Amperage X Seconds = Coulombs — Amount of current.

Amperage X Seconds X Volts = Joules — Amount of work.

Amperage X Seconds X Volts X .24 = Calories — Amount of heat.

COMPLICATIONS INCIDENT TO THE OPERATIVE TREATMENT OF SIMPLE GOITER.

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The causes, the prevention and the treatment of the operative and postoperative accidents incident to the surgical treatment of simple goiter are well worthy of study.

Goiters associated with hyperthyroidism, primary or secondary, the various types of suppurative and malignant neoplastic disease of the thyroid gland differ so much from simple goiter in etiology, pathology, clinical manifestations and therapeutic indications that they are outside of the scope of this paper. Aberrant goiters, cervical, lingual, endothoracic, etc., presenting additional and special dangers by virtue of their anatomical relationships, are likewise excluded.

A simple goiter may, at any time, become the seat of: (a) *hemorrhage.* This may lead to a sudden and marked increase in the volume of the goiter, to cyst-formation or to extravasation of blood into the paratracheal, mediastinal and other neighboring regions. Any of these conditions, singly or collectively, can determine tracheal compression, obstructive dyspnea[1], [19] and necessitate immediate surgical relief. (b) *Abscess formation or diffuse suppuration.* This may occur in the course of, or after, any of the infectious diseases; it may occur in the absence of any other evident constitutional disturbance[2]. The advent of infection increases the pressure symptoms. (c) *Malignant disease[3]; sarcomatous or carcinomatous.* Malignant disease occurs more frequently in goitrous than in normal thyroid glands[3b]. (d) *Degenerative structural changes,* provocative of hyperthyroidism, hypothyroidism or dysthyroidism[4]. (e) *Inflammation.* The processes of degeneration present in goiters lower the local tissue resistance and predispose to inflammation. The swelling inherent to inflammatory, neoplastic and other degenerative processes of the thyroid gland

exerts nefarious pressure on the trachea and esophagus. The severity of this pressure is determined largely by the size and location of the swelling, tumor or cyst.

The operative removal of goiters eliminates these potential dangers and has further advantages. It can and should be strongly emphasized that intraglandular enucleation and subtotal thyroidectomy each gives extremely good immediate and remote functional results. The trachea is freed from all abnormal pressure. Many of the disturbances of phonation and respiration occurring immediately after operation are temporary, normal function being restored in from a few days to several weeks. Operations for simple goiter, for goiter unassociated with hyperthyroidism, are not attended with more than the usual risks incident to all major surgical operations. They give highly satisfactory cosmetic, functional and curative results, especially if surgical relief is sought before the patient has been subjected to repeated courses of iodine therapy and before the occurrence of degenerative visceral changes.

De Quervain[5] reports 2,200 operations for simple goiter with a mortality rate of 0.86 per cent. For all patients up to forty years (1,682 cases), the mortality was only 0.06 per cent. In patients under the fortieth year, these operations, performed according to the approved present-day technic, are practically devoid of risks. The risks increase rapidly thereafter; after the sixtieth year, in the absence of urgent indications, it is preferable not to operate.

Operative treatment is indicated in all forms of simple goiter, the goiter of adolescence, of pregnancy and of the menopause being excepted, if the goiter, by its pressure, causes: (a) *Respiratory disturbances* (bronchitis, pulmonary emphysema, obstructive dyspnea, asphyxia, etc.) In all patients presenting symptoms of obstructive dyspnea, early intervention is urgently indicated. (b) *Circulatory disturbances.* Many goitrous patients are cardio-vascular, cardio-renal defectives. "Every goitrous patient is exposed to asphyxia and to cardio-vascular accidents"[11]. "A goitrous patient is predisposed to myocardial disease"[12]. (c) *Nervous disturbances.* "The paralysis of the recurrent laryngeal nerve which antedated the operation, in ten cases was not improved by the operation"[4]. (d) *Difficulty in deglutition.* (e) In the presence of severe pain, of unsightly deformity, of rapid growth of the goiter. (f) If the goiter becomes excessively large, interfering with the patient's work, with his sleep in the recumbent posture. (g) If the goiter does not respond to medication. One should not lose sight of the dangers of non-operative methods. Hyperthyroidism has followed treatment by radium, by serum, by injections of boiling water, etc. As adenomata of the thyroid gland do not respond to medication, they should always be removed. Operation reveals the relation of the goiter to the other cervical structures, shows whether the goiter extends into the thoracic cage, around the trachea to the esophagus, etc.

Accurate and detailed knowledge of the origin and nature of the operative and post-operative dangers incident to intraglandular enucleation and to subtotal thyroidectomy acts as an incentive to early, to more timely operations and to the institution of surgical relief previous to the advent of local complications and previous to the development of degenerative visceral changes. The earlier the operation, the less the risks, the better the end-results. Timely operations skillfully performed will lessen the frequency and the morbidity of the accidents herein considered, will reduce the operative mortality and improve the end-results.

These surgical complications, avoidable or unavoidable, of minor or major importance, are due, in part, to the patient's unfavorable physical condition at the time of operation, to the use of a method of anesthesia not adapted to the case at hand, to lack of proper correlation of the anesthetic to the technic, to the operator's lack of technical skill, experience and judgment in surgery of the neck, etc. Owing to the study given to diseases of the thyroid in recent years, these accidents are now better recognized, better understood and better managed. The main conditions that may confront the operator are: hemorrhage, primary or secondary; injuries to the recurrent laryngeal nerve or nerves (compression, contusion, laceration, division); injuries to, or partial or complete removal of, the parathyroid glands (tetany); postoperative hyperthyroidism; excessive removal of thyroid tissue (myxedema); and postoperative infections. Chief among the uncommon complications are:

air embolism, collapse of the trachea, esophageal injuries, pneumonia and recurrence of the goiter. Complications, such as unilateral or bilateral division of the sympathetic and vagus nerves, injury to the pleura, etc., which we have not met in our private or hospital practice, we refrain from discussing.

Hemorrhage.—This is of arterial, venous, capillary or mixed origin. In operating on goiters, we are operating in a very vascular region, on a vascular organ, an abnormally vascular organ. The thyroid gland presents extensive anastomoses not only between the vessels of the same lobe, but also between those of the different lobes. After ligation of the four thyroid vessels, the circulation is re-established through extraglandular anastomoses[16]. Serious hemorrhage may occur at the time of operation, immediately after the patient has been conveyed to bed or during the postoperative period.

At the time of operation, some hemorrhage is unavoidable. Profuse hemorrhage[5] must be guarded against; it is alarming and, if not controlled, may prove fatal. The vessels of a goitrous thyroid gland show a marked tendency to degeneration. They are dilated, their elasticity is impaired, they tear easily. In some cases, the cervical veins, especially those located at the lower part of neck, are dilated tremendously. The arteries show a thickening of the intima and degeneration of the elastic fibrillae. Care must be taken not to injure the internal jugular veins or the carotid arteries. During the operation, owing to the lowered blood pressure, small arterioles and venules may not bleed and thereby escape ligation or suturing. With the return of consciousness, the blood pressure rises and hemorrhage may occur. Immobilization of the operative region not being feasible for the first two days following the operation, the patient is to be closely watched, as violent coughing, violent retching, vomiting, too frequent change of position and undue activity can bring on abnormal intravenous pressure, followed by hemorrhage.

Secondary hemorrhage, following thyroidectomy, may be sufficiently serious to cause death. Chief among its causes are premature absorption, slipping or unknotting of unsecurely tied ligatures, erosion of vessel-walls, errors of technic such as faulty asepsis, overlooking of bleeding points at time of operation, delayed removal of drains, etc.

Hemorrhage manifests itself by pallor, rapid and superficial breathing, rapid and weak pulse; the dressings may be saturated with blood. If the hemorrhage be not checked, it leads to obstructive dyspnea, to asphyxia; it may result in collapse. The loss of blood in itself is a danger. Furthermore, the extravasated blood may exert dangerous compression on the trachea, thereby giving rise to serious respiratory disturbances.

In cases of secondary hemorrhage, reopen the wound widely and carefully and rapidly remove all the blood clots. Locate the bleeding points and ligate the bleeding vessels at their divided ends; reunite the wound edges and apply appropriate dressings. After the hemorrhage has been controlled, if the pulse be alarmingly weak, give normal salt solution subcutaneously and rectally and also such medicinal agents as are indicated.

To lessen hemorrhage, primary or secondary, operative or postoperative, always: (a) Operate in suitable surroundings, aided by competent assistants, and as rapidly as is consistent with the indications, with the patient's safety. It is needless to employ a long and laborious technic. Celerity is an element of success. (b) Use an incision that gives an adequate exposure of the goiter. (c) Be gentle in all operative maneuvers. There should not be any needless traumatizing of tissues, any avoidable tearing of vessels, etc. The rupture of a large deep-seated vein leads to troublesome hemorrhage and to an obscured operative field. (d) Secure thorough hemostasis. Keep the operative field as dry as possible from start to finish. Every bleeding point should be tied with catgut before the wound is closed. (e) Follow standard operative technic: knot all ligatures carefully, grasp and ligate veins as they are divided. It is not necessary to place a cartload of hemostatic forceps on the patient's neck. In goiter operations, attempts to permanently control hemorrhage by compression are unreliable. In the enucleation of adenomata, all dead spaces are to be obliterated by suturing.

Recurrent Laryngeal Nerve Injuries.—The recurrent laryngeal nerves[2] are more commonly injured than is believed. They supply all the muscles of the larynx except the cricothyroid.

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Dubs[21], in 840 goiter operations, reports twenty-six cases of recurrent nerve injury. Capelle[17], in 1,700 bilateral resections, had 1.3 per cent permanent injuries of the recurrent laryngeal nerve. In operations on goiters, the branches or trunk[26] of one or both nerves may be clamped, compressed, contused, stretched, lacerated, torn, included in a ligature or divided. Postoperative paralyses of these nerves are occasionally due to their inclusion in scar tissue, to their compression by inflammatory exudates or to the retraction of cicatricial tissue. The pareses or paralyses caused by injuries of the superior laryngeal nerve are not so manifest, not so significant as those due to recurrent nerve injuries and will receive here no further mention. An injury of the recurrent laryngeal nerve may be symptomless, may escape detection. It may first be detected by mirror examination of the larynx and may have only slight appreciable effect: a change in the pitch of the voice, more or less permanent hoarseness, slight difficulty in breathing, etc. When a unilateral nerve injury is not compensated by the uninjured vocal cord, aphonia, obstructive dyspnea and other symptoms result. "The complete restoration of phonation and respiration to normal occurs with restoration to normal of the muscles and cord on one side"[8]. Normal voice is restored through compensatory efforts of the normal cord.

Vocal cord paralyses of operative origin result from stretching, clamping, tying, or division of recurrent laryngeal nerve or nerves. Traumatic injuries unassociated with complete nerve division produce symptoms of a temporary character, symptoms which in time disappear[13]. Injuries involving both recurrent nerves constitute a serious complication. If both cords assume the cadaveric position, there follows a permanent aphonia and later an obstructive dsypnea which, if unrelieved, may be a contributing or decisive factor in the patient's death. Complete division of both nerves has resulted in death from deglutition pneumonia.

Preoperative mirror examination of the larynx gives the examiner exact and positive information concerning the state of the vocal cords[9]; it is a protection to the physician and to the patient. Previous to operation, one cord may be found to be motionless. When one nerve is paralyzed, the patient depends solely on one cord for phonation and normal respiration; in these cases it behooves the operator to be most careful not to injure the opposite and unaffected nerve.

The recurrent laryngeal nerves are found posterior to the capsule of the thyroid gland, along the side of the trachea and in the groove between it and the esophagus. By scrupulously respecting the posterior capsule with which the nerves are intimately associated, the recurrent laryngeal nerves, always, and the parathyroid glands, almost always, will remain uninjured. The recurrent laryngeal nerves and the parathyroid glands are most surely avoided by leaving the region they traverse entirely unmolested and by not removing the posterior mesial lower part of each lobe of the thyroid gland. Gentleness in the use of hemostatic forceps, in the insertion of sutures and in the handling of tissues tends to lessen the incidence of nerve injury. Rough attempts to shell out, to drag out a deep seated goitrous gland may so stretch the recurrent laryngeal nerves as to cause paralysis of both vocal cords. The nerves may be pinched by a hemostat with other tissue, may be included in a ligature. Some operators, in resecting the lobes of the thyroid gland, proceed from within out. At the time of the patient's discharge from the hospital, re-examine the larynx and determine the presence or absence of any incompetency of the vocal cords.

After subtotal thyroidectomy, loss of voice of varying degrees[8] is due to one or more of the following factors: (a) Change in position of the laryngeal muscles and cartilages, due to the removal of the goiter and the consequent shifting of the displaced larynx back into its normal place. (b) Edema, obstructive or inflammatory, of the laryngeal and perilaryngeal tissues. Keep the line of dissection away from the trachea and larynx, thereby saving more tissues about these structures and preventing the swelling from extending to the mucous membrane. The laying bare, the denudation of the trachea predisposes to severe bronchitis and endangers somewhat the recurrent laryngeal nerves. In catching bleeding vessels on the surface of the trachea, include in the ligatures as little as possible of the perivascular tissues. These tissues contain the sensory nerves to the trachea and their irri-

tation causes cough and increased secretion of mucus. (c) A true myositis. (d) Trauma of the recurrent laryngeal nerve. (e) Prolonged interference with function.

Pemberton, in discussing postoperative obstructive dyspnea, says: "The routine laryngeal examination of all patients before and after operation and the careful search for a traumatized recurrent laryngeal nerve in all cases of obstructive dyspnea coming to necropsy, has clearly demonstrated that the cause of fully 90 per cent of all cases of marked postoperative obstructive dyspnea is due to a paralysis of one or both vocal cords, the result of an injured inferior laryngeal nerve."

If the vocal cords be in the middle line position, the same author suggests one of the following three procedures: (a) Permanent tracheotomy. This has obvious disadvantages. (b) Removal of a portion of one vocal cord and of part of the ventricle. This may result in aphonia; it may give only partial relief. (c) The descending branch of the hypoglossal nerve has been anastomosed to the inferior laryngeal nerve (Frazier). This procedure is difficult and is, as yet, only in the experimental stage. Crile[14] advises that the vocal cords be clipped in the center of their free margins, leaving a free space for the passage of air.

Postoperative Tetany. — The parathyroid glands, four in number, two on each side, are, as a rule, located posterior to the capsule of the thyroid gland and lateral to the esophagus. These glands, inconstant in number, irregular in location, have a function which appears distinct and separate from that of the thyroid gland. Their physiological importance is out of proportion to their small size. The anatomical integrity of these glands is of essential importance to the human organism. Numerous theories concerning the function of these structures have been advanced. They are said to regulate muscle tonus, to form a part of the detoxication metabolism of the body and to control calcium metabolism[24]. Calcium metabolism enters into many medical problems.

The prophylaxis of postoperative tetany presents difficulties due chiefly to the irregularity in number and location of the parathyroid glands. According to most anatomists, the parathyroid bodies receive their blood supply[15] from tributaries of the superior and inferior thyroid arteries and from anastomotic branches of the esophageal arteries. Postoperative tetany is infrequent. It can be caused by any interference with the blood or nerve supply of the parathyroid glands which may follow direct trauma, pressure from obstructive or inflammatory edema of surrounding parts, contraction or retraction of scar tissue, or by removal of one or more parathyroid glands. The parathyroid glandules, after interference with their blood supply, do not resume their function and the manifestations of tetany do not come to an end before the collateral circulation is reestablished.

De Quervain[25], in 2,203 goiter operations, never had a case of pronounced tetany. He observed symptoms of slight functional disturbance of the parathyroids in only three patients. The best technicians take great care neither to traumatize nor to remove any of these glandular bodies. Injury and removal of the parathyroids can almost always be avoided by leaving a layer of glandular and capsular tissue undisturbed at the back of the thyroid gland. This same precaution protects the recurrent laryngeal nerves.

The deficiency of one or two parathyroids may not cause hypoparathyroidism. Nevertheless, if a parathyroid gland be accidentally removed, it should be transplanted at the close of the operation, preferably beneath the remaining thyroid lobe. Be sure of the nature and state of the transplant. We advise this because the actual condition of the individual glands is not known, as they are often rendered useless by hemorrhage or degenerative changes.

Eiselsberg[17], in 2,373 goiter operations, records six deaths from tetany; six other patients developed chronic tetany. Knaus[18] reports 619 goiter operations. Five of these were followed by tetany; three recovered and two died. As the operation is nowadays usually bilateral and less radical and because surgeons have come to realize fully the value of preserving some part of the thyroid gland on the posterior capsule, injury to the parathyroids is of very infrequent occurrence. Leave the posterior capsule; do not remove it.

Parathyroid insufficiency may appear any time from six hours to three or four months after operation[20]. It almost always manifests itself by circumoral pallor, by a tight glossy appearance of the skin of the forehead, nose

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and face, by a sensation of stiffness in the fingers, by carpopedal spasms, etc. It is difficult for the patient to raise his fingers to his mouth or to hold anything. The lowered calcium content of blood serum or plasma causes exaggerated nervous irritability (MacCallum). These symptoms pass off in a few hours or a day, possibly after one or two doses of morphine, or the condition gradually progresses until the contractions involve the muscles of the hands and arms; sometimes the contractions become general. If, in the course of goiter operations, injury or removal of the parathyroid bodies be avoided, tetany will be a rare complication and will occur only in its slightest forms.

Postoperative tetany is treated as follows:

(a) By restoring the calcium content of the blood serum to within normal limits. This is effected by administering calcium lactate, gr., xx., every four hours until relief is obtained. It is to be given orally, by enema, subcutaneously and exceptionally, intravenously and in larger doses, if necessary. The calcium lactate should be given in water and continued as long as the patient shows symptoms of nervous irritability such as Chvostek's and Trousseau's signs.

(b) By transplanting human parathyroids. The parathyroids used are obtained from fatal accident cases and from normal infants who have died during delivery. These transplants are difficult to obtain, are readily absorbed and of service to the organism[15], while the remaining parathyroids undergo compensatory hypertrophy, or the injured or diseased ones recover. Transplantation may be made in the left abdominal wall between the peritoneum and the rectus muscle. Should the patient later submit to an operation for appendicitis, the transplants will not be disturbed. Some operators embed the grafts in the supraclavicular fossa beneath the cervical fascia. The microscope enables one to determine whether or not the transplant is unquestionably parathyroid tissue.

(c) By the various parathyroid serums in the market.

(d) By the ingestion, orally, of parathyroid products. Lahey[11] and others dispute the therapeutic value of parathyroid extracts.

(e) By medicinal therapy largely symptomatic in nature. Chloral hydrate per mouth or per rectum, repeated as needed; morphine sulphate; magnesium sulphate in 25 per cent solution subcutaneously[15,20]. Have patient drink plenty of milk and avoid all kinds of meat.

Air Embolism.—It is a possible, though a very uncommon complication of operations about the neck. Many active surgeons possess only a theoretical knowledge of the condition. Among its predisposing etiological factors should be mentioned: the restlessness of patients operated upon under local anesthesia, great loss of blood and wounds of valveless dilated veins. From the prognostic standpoint, owing to its rarity, it is almost negligible.

If during inspiration air is sucked into a wounded vein and carried to the right heart, there is usually produced a peculiar whirring or churning sound synchronous with the cardiac systole. The danger of this complication is in direct ratio to the quantity of air aspirated and to the rapidity with which it enters the veins. If dangerous symptoms or death do not immediately follow the occurrence of air embolism, the accident need not cause the surgeon any further worry. A few cases of temporary paralysis due to air embolism are recorded in the literature.

Treatment.—Prophylaxis is the watchword. To lessen its incidence, keep in mind its possibility, minimize hemorrhage, avoid rough handling of tissue, keep patient in the horizontal recumbent position during the entire operation (the sitting posture favors the development of air embolism) and doubly ligate large veins before dividing them[23].

As soon as this accident occurs, to prevent further aspiration of air, elevate the foot of the table, tampon and flush the wound with normal salt solution. While the tampon is being cautiously removed, clamp the wounded vein or veins and ligate them. Artificial respiration may lead to more air aspiration and therefore is not to be practiced. Naegele, Jehn and others used forced inhalation of oxygen.

Tracheal Collapse.—Long continued, unilateral or bilateral, pressure of voluminous goiters can determine either a loss of elasticity, a softening, an atrophy or an almost complete disappearance of the cartilaginous tracheal rings. In these cases, the trachea, after losing the support afforded by its attachment to the thyroid gland, sometimes persists in

kinking and in collapsing at the close of the operation. There is no danger of tracheal collapse if the tracheal rings are normal. Many factors enter into the causation of tracheal flattening and collapse: the patient's age, the goiter's histological structure and consistency and, especially, the long continued traction or pressure exerted by the goiter as in the scabbard trachea.

Collapse of the trachea causes obstructive dyspnea, amounting, in some cases, to asphyxia. With increased violence of the inspiratory efforts, there results a more complete mechanical obstruction to respiration.

Tracheal collapse may be fatal[3b]; in extreme cases, it may necessitate a tracheotomy[23]. It may take days, even weeks, for the trachea to recover its efficiency. In about six months, complete recovery usually takes place.

Treatment.—By means of a sharp tenaculum inserted on each side of its collapsed portion, the trachea is drawn forward. Should collapse persist or the trachea show signs of recurring collapse, fasten, by a few catgut sutures (stay sutures), the sides of the trachea to the surrounding tissues, or fix the resected goiter stumps to the undersurface of the sternocleidomastoid or omohyoid muscles and thus secure the tracheal dilatation and prevent the recurrence of the collapse. Avoid perforating, by needle or tenaculum, the cartilaginous rings, or the entire thickness of the tracheal wall, and thereby eliminate such complications as necrosis of tracheal rings, wound infection, etc.

Tracheotomy is rarely indicated. In twenty-three cases of tracheal collapse due to tracheomalacia, Czermak performed it only twice.

Recurrence of Goiter.—Recurrence of goiter and recurrence of symptoms are noted in a small and decreasing percentage of cases. The portion left, the opposite lobe or the isthmus, may hypertrophy. It is most frequent within the first five years after operation[22] Recurrence causes symptoms chiefly when bilateral. Some recurrences cause only cosmetic defects. After enucleation, cysts or adenomata of new formation have been observed. Dubs[21], in 840 goiter operations, reoperated fifty-three patients in each of which the recurrent goiter visibly and palpably exceeded the normal consistency and size of the thyroid gland.

If the operators underestimate the amount of gland tissue to be removed, if the blood supply of the tissue left is not sufficiently shut off, if the primary cause of the goiter persists, if focal infections are left untreated, recurrence is more probable. Recurrences become fewer as the surgeon's experience increases.

In general, the amount of tissue to be left should be the functional equivalent of a normal gland.

Postoperative Prophylactic Treatment.—The use of boiled drinking water, orange juice, the suppression of all foci of infection (teeth, tonsils and others), etc., is very important. I follow the practice of Crile[20], who believes that, by giving minute doses of iodine for not less than one year after thyroidectomy, recurrences are prevented. In this connection, keep in mind that some patients are iodine-refractory and others are iodine-susceptible. Operation on a recurrent goiter is more dangerous than the primary operation, on account of the necessity of preserving an adequate amount of gland tissue and of the presence of cicatricial adhesions.

Postoperative Hyperthyroidism.—Owing to the present-day combined medical and surgical treatment of goiter cases, postoperative hyperthyroidism is infrequent. According to the latest researches, it follows the entrance of glandular elements and ferments squeezed out of the gland into the circulation. The absorption of thyroid secretion, during the operation and afterwards, also takes place through the wound surface. The patients are seized by a psychic storm, usually of an agitated maniacal type, there is restlessness, accelerated pulse rate, reaching 150 to 160 per minute, elevation of temperature (105° to 106° F.), disturbed cardiac action, etc.

The frequency and severity of postoperative hyperthyroidism are lessened by observance of the following precepts: Operate as rapidly as consistent with the patient's safety and the completeness of the operation, secure perfect hemostasis, avoid squeezing of the gland and all needless traumatizing of tissue, make ample provision for drainage and see that oozing blood and effused thyroid secretion escape easily and do not remain in contact with the wound surface.

Drainage relieves tracheal compression due to postoperative hemorrhage and prevents

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hematoma formation. After all goiter operations, give large quantities of normal salt solution subcutaneously and rectally. By this practice the absorption of thyroid secretion is lessened and general elimination is increased. For the high temperature, the cold pack is most serviceable.

Postoperative Myxedema.—Total thyroidectomy, having been frequently followed by myxedema, is now no longer performed. In goiter operations, hypothyroidism will not result if a small piece of thyroid tissue with adequate blood and nerve supply is left. "The old procedure of removing one lobe is inadequate. The dictum that one-fifth of the thyroid mass should be left is equally unsatisfactory"[27]. If we leave a quantity equal to about one-fourth of the health gland, symptoms of thyroid deficiency will not develop. In the individual case, the quantity of gland tissue to be saved is to be left to the surgeon's judgment. He alone has a thorough knowledge of the patient's condition. This is essential to determine when and what to do rather than where and how to do it. Some operators leave small masses at each horn of the organ and, in addition, a thin layer of thyroid tissue attached to the posterior untouched part of the gland capsule. These masses are well supplied with blood and lymphatic vessels and can, if needed, undergo compensatory hypertrophy.

In postoperative myxedema, there is impaired memory and intelligence, there is apathy, somnolence, great disinclination to effort. An edematous swelling of the skin develops and the patients complain of feeling cold. In young individuals, the growth is stunted. Hypothyroidism is characterized by a definite reduction in the basal metabolism; the metabolic rate is always lower than that of normal individuals of the same age and sex.

The successful management of these cases is one of the noteworthy triumphs of organotherapy. Institute treatment at the first appearance of symptoms. Make up the deficit of thyroid secretion by thyroid treatment. In directing and guiding thyroid administration, metabolic rate determinations are of the greatest importance. Bring the patient's metabolism to normal and ascertain the dose necessary to keep it there. The patient is to be given iodothyrin or another suitable preparation of thyroid gland or may be fed thyroid gland substance. The active principle of the thyroid gland, thyroxin, may be given intravenously. Thyroid gland tissue has been implanted. The treatment by organotherapy is to be continued for weeks, for months and thereafter is continued intermittently for some time; it may have to be continued for many years. In course of time, the symptoms of thyroid deficiency usually subside and may permanently disappear.

Postoperative Infections.—Despite careful asepsis and perfect hemostasis, every now and then postoperative infections occur. They usually come from without, exceptionally, from within. In their causation, local tissue resistance and the individual's general resistance are not negligible factors. In the space remaining after removal of the goiter, blood and wound secretion easily pool and are prone to infection.

The indication is self-evident. Let your technic be flawless. Do not wound the trachea or the esophagus; these wounds are often followed by infection of neighboring regions. Should the esophagus be accidentally wounded, immediate exact apposition and suture of the wound edges is indicated. After all goiter operations, drain for about forty-eight hours, thereby preventing the symptoms and sequelae due to retained thyroid secretion and extravasated blood. The treatment of postoperative infections occurring in this region is that of infections in general.

Postoperative Pneumonia.—Owing to its unfavorable prognosis, it always gives the clinician the greatest concern. The pain in the wound hinders expectoration and lung aëration. The pneumonia may be endemic or epidemic in nature, may be postanesthetic, may follow the aspiration of mucus, blood or stomach contents, may follow exposure to cold before, during or after operation, may be due to infective emboli, etc., but, most often, almost always, is primarily due to an injury of the recurrent laryngeal nerve or nerves. In the etiology of pulmonary complications, injury of the recurrent laryngeal nerve or nerves is the paramount factor. In old individuals, this condition is frequently hypostatic in type and fatal in outcome. The abandonment of prolonged anesthesia, the avoidance of unnecessary exposure, denudation and rotation of the trachea and especially, care not to injure the recurrent laryngeal nerves, have practically

eliminated postoperative pneumonia as a danger in goiter operations If by accident the trachea be opened, guard against the aspiration of blood. Should the latter occur, lung abscess or deglutition pneumonia may follow. The treatment of postoperative pneumonia is, as yet, purely symptomatic.

Disturbed Deglutition.—In dislocating large goiters, the nerves supplying the pharyngeal muscles may be traumatized. Dysphagia of several days' duration always follows goiter operations; it is usually manifested by pain on swallowing. Sometimes after operation, patient chokes when trying to swallow fluids. The liquid flows back into the nose or drops into the larynx and trachea. Combat this by turning patient on his face with his head over the edge of the bed; place the glass on the floor or on a low stand and let him drink through a tube uphill. All nourishment will have to be given in this manner until normal control of the pharynx is regained.

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59 *East Madison Street.*

Correspondence

Intramuscular Injections of Sugar Solutions in the Treatment of Tuberculosis.

Staunton, Va.,
December 21, 1925.

TO THE EDITOR:

At this time, I wish to make a preliminary statement as to the treatment of tuberculosis, including pulmonary forms, by the administration of intramuscular injections of sugar solutions, together with suitable doses of parathyroid given hypodermically. Four cases at

present under treatment will be reported in detail.

I conceived the plan early in the present year—1925. The results obtained have not been had by any other plan of treatment. The rationale of the treatment has a well developed and clearly formulated hypothesis. I shall be glad to outline the plan to any one.

MARSHALL J. PAYNE, M. D.

Miscellaneous

New Commandments for the "Common Doctor."*

By W. W. BROWN. M. D., Shenandoah Junction, W. Va.

Thou shalt have no favorites in newspaper correspondents in order to see thy name in print.

Thou shalt not bow down to graft, nor to the image of gold.

Thou shalt hold thy tongue when sued for malpractice, remembering silence is golden and that thy adversary is after thy gold and will get it if thou art not discrete.

Remember the Sabbath day and keep it holy; six days shalt thou labor and the seventh also, if thou hast an opportunity to do good or the prospect of a good fee.

Honor the fathers of thy profession, that thy days may be long upon the land and thy usefulness lengthened, through the example and achievements of thy fathers.

Thou shalt not sanction adultery nor produce an abortion.

Thou shalt not steal thy brother's patients nor forgive him whom he steals thine.

Thou shalt not kill thy brother's opportunity for earning a living, nor murder his chance of usefulness. He, probably, is thy superior.

Thou shalt not bear false witness against thy neighbor, nor speak evil of his good name. His reputation may be better than thine.

Thou shalt not covet the specialist's fee, nor dispute over a division. Let him have all the money; he may think he earned it. You must be content with glory.—*Selected.*

The Medical Liar.*

By W. W. BROWN, M. D., Shenandoah Junction, W. Va.

Shakespeare says, "All Men are Liars." He must have had in mind newspaper correspondents, as we know what famous liars they are, particularly in war time and political campaigns.

It is said that Napoleon, in one of his wars, inquired what the liars had to say about it, and Walter Page wrote to President Wilson, in 1914, that the whole world had gone to lying.

But we should take the position that all men are *not* liars; that truthfulness is normality, just as the absence of disease (health) is the normal condition of the human body, and morality the normal condition of the human mind; just as chastity is the normal condition of womankind, just as mankind is instinctively religious and normally spiritual.

Shakespeare is authority for the statement that "Some men are born great, others achieve greatness, whilst others have greatness thrust upon them." I would like to paraphrase this statement to read: "Some men are born liars, others achieve lying, whilst others have lying thrust upon them."

Another great authority in letters and the science and practice of Democratic Government, Woodrow Wilson, divided the medical profession into three classes: the common liar, the damn liar, and the expert, and we shall follow this classification.

THE COMMON LIAR.

The Common Liar is he who has lying thrust upon him. He is the progressive liar, the reciprocal liar, the ethical liar, the optimistic liar, the physiological liar, the helpful liar, who will step aside from the beaten paths of truth to help a friend, or to save a girl's reputation, and the honor of the family. He it is who can say with the poet Foss:

"Let me live in a house by the side of the road,
Where the race of men go by—
The men who are good, and the men who are bad,
As good and as bad as I."

He is very much in the majority, as he constitutes the body and bulk of the profession. I should think that the character as portrayed in the book, "Beside the Bonnie Briar Bush" as "a doctor of the old school" represents this type. We all remember reading the death scene of William MacLure.

Drumsheugh put on his spectacles and searched for a comfortable Scripture, while the light of the lamp fell on his shaking hands and the doctor's face, where the shadow was now settling.

"Ma mither aye wantit this read tae her when she was sober," (weak) and Drumsheugh began, "In my Father's house are many mansions," but MacLure stopped him.

"It's a bonnie word, and yir mither was a sanct; but it's no for the like of me. It's ower gude; a' daurna tak it.

"Shut the buik an' let it open itsel', an' ye'ill get a bit a've been reading every nicht the laist month."

Then Drumsheugh found the Parable wherein the Master tells what God thinks of a Pharisee and of a penitent sinner, 'till he came to the words: "And the publican, standing afar off, would not lift up so much as his eyes to heaven, but smote upon his breast, saying, 'God be merciful to me a sinner.' "

"That micht hae been written for me, Paitrick, or eny ither aulde sinner that has feenished his life, an' has naethin' tae say for himsel'!"

"Oud ye pit up a bit prayer, Paitrick?"

"A' haena the words," said Drumsheugh in great distress; "wud ye like's tae send for the minister?"

"It's no the time for that noe, an' a' wud rather hee yersel'—juist what's in yir heart, Paitrick; the Almighty 'ill ken the lave (rest) Himsel'."

So Drumsheugh knelt and prayed with many pauses.

"Almighty God—dinna be hard on Weelum MacLure, for he's no been hard si' onybody in Drumtochty—Be kind tae him as he's been tae us a' for forty year—. We're a' sinners afore Thee—. Forgive him what he's done wrang an' dinna cuist it up tae him—. Mind the fouk he's helpit—the weemen and bairnies—an' gie him a welcome hame, for he's sair needin't aifter a' his wark. Amen."

THE DAMN LIAR.

The Damn Liar is the born liar, the vicious, contemptible, pathological liar, who pursues his journey in boasting of his success, in taking credit home, in spreading his bull literature over the pages of the Medical Journal and in scheming to injure his fellows and is soiling his feet with the slime of the

*Read at the meeting of the Norfolk and Western Railway Surgeons in Norfolk, Va., November, 1925.

Jungle, little realizing the fact that as he is spewing out his venom, he is setting his own ductless glands to secreting a poison that will result in aches and pains and a shortened life, overlooking the fact that to be poisoned with one's own secretion is a suicidal boomerang. He is ignorant of the truth of the Master's command, "All they that take the sword shall perish with the sword." He is vastly in the minority and exists only to be mentioned and avoided. No white robed forms will guide him to the Heavenly Mansions, as the Devil, the father of liars, has a mortgage on him, which he forcloses at once.

THE EXPERT LIAR.

The Expert Liar is he who has achieved lying. He is the learned member of the profession, usually a college Professor, or an editor of a Medical Journal and a chronic witness before the courts on all important cases where mind or life is at stake—but influencing the decision but little. It is said that environment either elevates or degrades character. Likely, the intelligent juryman regards the expert as a man who seeks notoriety and gold, who has commercialized his profession, and whose contact and association with the legal fraternity has not been ennobling and elevating. The expert, however, like the common practitioner, has his visions founded on fact. For instance, Dr. Frank Hamilton, a distinguished alienist, two years before the World War, wrote an article for the *North American Review*, wherein he stated that the Kaiser of Germany was a paranoic—a man of ungeared mind, who was not fit to govern his own country or live in amity with his neighbors. Had this vision been heeded, much trouble would have been avoided. This expert, however, is able to take care of himself, even when "life's fitful dream is over." I imagine seeing one of this favored class, as soon as the breath has left the body, rushing up the Golden Stairs and pushing aside the common practitioner in his eagerness to reach the Pearly Gates. He knocks, and St. Peter appears with the question, "Who comes here?" He answers, "A poor Pilgrim, who has left the attractions of the world, but who now wishes to walk the Golden Street, to behold the Thrones of Glory, to hear the harpers with their harps, and to join in the singing of the "New, New Song." "Who are you?" "A noted Specialist and leading physician, and I do not come empty handed." "I know that" answered St. Peter. "as we have your record, but what special recommendation have you?" "I was a witness before the Dayton trial court." "Were you with Darrow or Bryan? I will warn you, however, that Mr. Bryan is here and near the Throne. Were you made out of dust, or did you ascend gradually from the monkey? We want the truth." "For once in my life I can at least tell the truth," answered the pilgrim. "I am an evolutionist." St. Peter paused for a minute, then threw open the door and said, "It may be a tight squeeze, but walk in."

The Truth About Medicine

In addition to the articles enumerated in our letter of October 30th, the following have been accepted:

Abbott Laboratories
- Arsphenamine—D. R. L., 0.3 Gm. Ampules.
- Arsphenamine—D. R. L., 0.5 Gm. Ampules.
- Neoarsphenamine—D. R. L,. 0.15 Gm. Ampules.
- Neutral Acriflavine Jelly 1:1000—Abbott.

Eli Lilly & Company
- Par-Thor-Mone—Lilly.
- Para-Thor-Mone—Lilly, P-20, 5 c.c.

Merrell-Soule Company
- Powdered Whole Lactic Acid Milk—Merrell-Soule.

Parke, Davis & Company
- Boro-Chloretone.
- Ovarian Residue Desiccated—P. D. & Co.
  - Capsules Ovarian Residue Desiccated—P. D. & Co., 5 grains.
  - Tablets Ovarian Residue Desiccated—P. D. & Co., 5 grains.
- Ovarian Substance Desiccated—P. D. & Co.
  - Tablets Ovarian Substance Desiccated—P. D. & Co., 5 grains.

Swan-Myers Company
- Ampoules Dextrose, 50 Per Cent., 20 c.c.—Swan-Myers.

NEW AND NON-OFFICIAL REMEDIES.

Arsphenamine D. R. L. 0.3 Gm. Ampules—Each ampule contains arsphenamine—D. R. L. (New and Non-official Remedies, 1925, p. 47), 0.3 Gm. The Abbott Laboratories, Chicago.

Arsphenamine—D. R. L., 0.5 Gm. Ampules.—Each ampule contains arsphenamine—D. R. L. (New and Non-official Remedies, 1925, p. 47), 0.5 Gm. The Abbott Laboratories, Chicago.

Neoarsphenamine—D. R. L. 0.15 Gm. Ampules.—Each ampule contains neoarsphenamine—D. R. L. (New and Non-official Remedies, 1925, p. 49), 0.15 Gm. The Abbott Laboratories, Chicago.

Scarlet Fever Streptococcus Antitoxin—Lederle (Refined and Concentrated).—A scarlet fever streptococcus antitoxin (Jour. A. M. A., May 2, 1925, p. 1338). prepared by immunizing horses by the subcutaneous injection of the toxic filtrate obtained by growing the scarlet fever streptococcus in broth; also by injecting cultures of the scarlet fever streptococcus. It is marketed in syringes containing 1 c.c. and in syringes containing 10 c.c. Lederle Antitoxin Laboratories, New York.

Saubermann Radium Emanation Activator, 100,000 Mache Units.—Each apparatus (New and Non-official Remedies, 1925, p. 315), imparts about 36 microcuries (100,000 Mache units) to about 500 c.c. of water daily. Radium Limited, U. S. A., New York (Jour. A. M. A., Nov. 7, 1925, p. 1487).

Para-Thor-Mone—Lilly—Parathyroid Extract—Collip—A stable, aqueous solution containing the active principle or principles of the parathyroid gland of cattle, having the properties of relieving the symptoms of parathyroid tetany and increasing the calcium content of blood serum. It is standardized by its capacity to increase the blood serum calcium in normal dog: one unit being defined as one one-hundredth of the amount of solution required to cause an increase of 0.005 Gm. of calcium in the blood serum of a 20 kilogram dog. Para-Thor-Mone—Lilly relieves the tetany of parathyreodectomized dogs and by its continued daily administration in small doses, further attacks may be prevented. The product is a most potent therapeutic agent and its use may be attended with great danger unless due precautions are taken. It is claimed to be a specific in parathyreopriva and to have relieved acute and chronic tetany following thyroidectomy, so-called idiopathic tetany and infantile tetany. Para-Thor-Mone—Lilly, is marketed in 5 c.c. ampules, each c.c. of solution containing 20 units. Eli Lilly & Co., Indianapolis. (Jour. A. M. A., Nov. 14, 1925, p. 1559).

Neutral Acriflavine Jelly 1:1,000—Abbott. Neutral Acriflavine—Abbott (New and Non-official Remedies, 1925, p. 134) 0.1 part, dissolved in karaya gum jelly, containing sufficient sodium hydroxide so that the finished product has a pH of from 8.3 to 8.5, to make

100 parts. Abbott Laboratories, Chicago. (Jour. A. M. A., Nov. 28, 1925, p. 1729).

PROPAGANDA FOR REFORM.

Lactic Acid Milk.—New and Non-official Remedies brings out that there is considerable evidence in favor of the therapeutic value of soured milk—particularly of sour milk containing an abundance of living *B. acidophilus*. Whereas the administration of *B. acidophilus* has for its object the implantation of living *B. acidophilus*, there are reports which indicate that the administration of milk sugar may produce the same results through promoting the growth of aciduric bacteria normally present in the intestinal flora. (Jour. A. M. A., Nov. 14, 1925, p. 1578).

Horse Dung Allergen—Squibb, House Dust Allergen—Squibb, La Page's Glue Allergen—Squibb, and Street Dust Allergen—Squibb, Not Acceptable for N. N. R.—These are proposed for use in determining specific sensitiveness. The Council on Pharmacy and Chemistry reports that, since the composition of horse dung, house dust, glue and street dust is indefinite, it is irrational to test the hypersensitivity of a patient by means of a stock preparation; therefore, the Council finds these preparations of E. R. Squibb & Sons unacceptable for new and Non-official Remedies. (Jour. A. M. A., Nov. 7, 1925, p. 1504).

Vitanol Not Acceptable for N. N. R.—The Council on Pharmacy and Chemistry reports that Vitanol (Daub Chemical Co., Brooklyn), "the all year round tonic," is stated to have the following composition: "Egg yolk, 8%; Lecithin, 1.5%; Hemoglobin, 1.5%; Ferri Albuminate, 1.5%; Cod Liver Oil, 25%; Glycerin, 9.5%. Vehicle used contains sugar, terpenless oil of lemon, and whisky, giving an alcoholic equivalent of 20%." Vitanol, being a complex and irrational mixture of uncontrolled composition, marketed with unwarranted therapeutic claims and in a way to invite its indiscriminate and ill-advised use by the public, was found unacceptable for New and Non-official Remedies by the Council. (Jour. A. M. A., Nov. 7, 1925, p. 1504).

More Misbranded Nostrums.—The following products have been the subject of prosecution by the authorities charged with the enforcement of the Federal Food and Drugs Act: Grandma's Compound Sarsaparilla (Park Laboratory Co., San Antonio, Texas), consisting essentially of potassium iodid, alcohol, with plant extractives including a laxative drug, sugar, water and flavoring. Hooper's Anodyne (O. P. Hooper Chemical Co., Chester, Pa.), consisting essentially of morphin hydrochlorid, glycerol, sugar, salicylic acid and water, flavored. Ark-A-Lu (Vawter Drug Stores, Monroe, La.), consisting essentially of Epsom salt, iron chlorid, nitric and hydrochloric acids and water, with flavoring. Sanita (Newer Novelties Co., Los Angeles, Cal.), consisting essentially of capsules of cacao butter and tannin, with a trace of boric acid. D-O-D (R. Burbach, West Allis, Wis.), consisting approximately of 93 per cent of baking soda, 6 per cent of potassium permanganate and a small quantity of Epsom salt. Rose's Whooping Cough Remedy (Aschenbach & Miller, Inc., Philadelphia), containing syrup, potassium nitrate, arsenic and cyanid. A. D. S. Special Kidney and Bladder Pills (American Druggists' Syndicate, New York), consisting of hexamethylenamin and extracts of plant drugs, including small quantities of resins and volatile oils mixed with magnesium carbonate. (Jour. A. M. A., Nov. 14, 1925, p. 1576).

Radium Ore Revigator.—Capitalizing the discovery of radium and radioactivity, water jars containing as a part of the wall of the jar or as an accessory low grade radioactive ore are being sold under the general claim that they render water that is put into them, radioactive and that this radioactive water will "make you well if you are sick and keep you from getting sick if you are well." One of the most widely advertised of these devices is known as the Radium Ore Revigator, put out by a California Company. From the advertising claims the impression is gained that ill health is caused by the lack of radio-activity in our drinking water, that the curative properties of certain mineral waters have been shown to be due to their natural radioactivity and that many ills are cured by the use of water from the "Revigator" jars. Even if the water from the jars has the radioactivity claimed, this is so small that it has no therapeutic significance. (Jour. A. M. A., November 21, 1925, p. 1658).

Side-Lights on Intravenous Medication—Intravenous injection involves difficulties of technic, with the possibility of local injuries to the peripheral blood vessels at the seat of operation. It presents dangers of bacterial contamination; the vehicle as well as the drug is immediately foreign to the blood, and other objections have presented themselves. The Council on Pharmacy and Chemistry has taken a decidedly conservative attitude toward the recognition of the scores of products intended for direct intravenous use. The wisdom of this stand has been attested anew by a recent report of Hanzlik and his collaborators who report that a large variety of substances cause definite and important changes in arterial blood of test animals, accompanied as a rule by disturbances in physiologic functions. (Jour. A. M. A., November 21, 1925, p. 1645).

Herradora Products and Intravenous Therapy.—In 1923, the Council on Pharmacy and Chemistry found the intravenous preparations of the Scientific Chemical Co. (Marcus Aurelio Herradora, president), not acceptable for New and Non-official Remedies, because of unwarranted and unsubstantiated statements in favor of intravenous and intramuscular administration of drugs and because of the complex and indefinite mixtures as represented by these specialties. From an examination of advertising recently received, there appears to be every reason to reiterate the Council's conclusion that "the propaganda contained in the advertising matter issued by the Scientific Chemical Company is detrimental to the rational practice of medicine and to the public health." (Jour. A. M. A., Nov. 21, 1925, p. 1660).

Diabesan.—The Council on Pharmacy and Chemistry reports that Diabesan (Solosan Co., Morristown, N. J., A. H. Werner, president), is claimed to contain as its chief therapeutic agent ". . . the trypsin of dead yeast cells . . ." and is said to be "indicated in all cases of diabetes and glycosuria."

The Council reports that the evidence in support of the claims made for Diabesan is contained in a paper written by A. H. Werner, the president of the Solosan Co., and that the paper contains a number of fallacies that vitiate the rather intangible and poorly written arguments; further, the available information seems to show that A. H. Werner is not a properly qualified medical authority. The Council concludes that the claims for Diabesan are not in harmony with accepted facts, nor supported by acceptable evidence; nor does there appear to be any evidence that trypsin—or a preparation such as Diabesan, said to contain it—has any value in the treatment of diabetes. (Jour. A. M. A., Nov. 28, 1925, p. 1747).

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Distribution of Doctors in Virginia According to Population and Area.

The following tabulation, furnished us bythe State Board of Health, is published because of the interest it holds for all doctors:

COUNTY	Population	Area Square Miles	Number of Doctors	Population per Doctor	Area per Doctor
*Chesterfield	21746	471	4	5438	117
Buchanan	16882	514	4	4220	128
Patrick	16850	485	4	4212	121
Franklin	26283	697	8	3285	87
Greene	6369	155	2	3184	77
Dickenson	15556	325	5	3111	65
Carroll	21361	458	7	3051	65
Louisa	17324	516	6	2887	86
York	8179	136	3	2726	45
Isle of Wight	14433	314	6	2405	52
Charles City	4793	188	2	2396	94
Lunenburg	16408	430	7	2344	61
Charlotte	18351	496	8	2294	62
King and Queen	9161	320	4	2290	80
Cumberland	9111	293	4	2277	73
King William	8827	263	4	2206	65
Brunswick	21850	557	10	2185	55
Prince George	17307	294	8	2163	36
Fluvanna	8650	285	4	2162	71
Westmoreland	10668	252	5	2133	50
Craig	4100	333	2	2050	166
Halifax	41991	814	21	1999	38
Lancaster	9757	130	5	1951	26
Bedford	31188	791	16	1949	49
Appomattox	9419	342	5	1883	68
Page	15058	322	8	1882	40
Buckingham	14885	584	8	1860	73
Richmond	7442	204	4	1860	51
Scott	25222	543	14	1801	58
Smyth	22958	435	13	1766	33
Southampton	28135	604	16	1758	37
Nelson	17487	473	10	1748	47
Essex	8542	258	5	1708	51
Gloucester	11894	223	7	1699	31
Powhatan	6760	273	4	1690	68
Botetourt	16557	548	10	1655	54
Floyd	13115	376	8	1639	47
Middlesex	8157	146	5	1631	29
Stafford	8118	274	5	1723	54
Princess Anne	14599	279	9	1622	31
Mecklenburg	32252	669	20	1612	33
Madison	9595	324	6	1599	53
Rockbridge	20626	616	16	1552	38
Surry	9305	278	6	1550	46
Tazewell	29181	531	19	1535	27
James City	6138	164	4	1534	41
*Elizabeth City	25910	54	17	1524	3
Amherst	20159	470	8	1519	58
Russell	20321	496	19	1490	26
Goochland	8863	287	6	1477	47
Amelia	10201	371	7	1457	53
Caroline	15954	529	11	1450	48
Greenesville	11606	307	8	1450	38
Bland	5797	360	4	1449	90
Nottoway	14485	310	10	1448	31
Lee	25964	446	18	1442	25
Prince William	14417	345	10	1441	34
King George	5762	180	4	1440	45
Clarke	7165	171	5	1433	34
Hanover	18498	512	13	1422	39
Grayson	19816	425	14	1415	30
Northampton	18397	239	13	1415	18
Mathews	8447	94	6	1407	15
Fairfax	22967	417	17	1351	25

*Near City.

COUNTY	Population	Area Square Miles	Number of Doctors	Population per Doctor	Area per Doctor
Rockingham	36395	876	27	1347	22
Rappahannock	8079	274	6	1346	45
Giles	12028	369	9	1336	41
Northumberland	11860	205	9	1317	22
Pulaski	17111	333	13	1316	25
Pittsylvania & Danville	81878	1015	63	1299	16
Fauquier	21869	666	17	1286	39
Sussex	12834	515	10	1283	51
Warren	8974	216	7	1282	30
Wise	52219	420	41	1272	10
Highland	4931	422	4	1232	105
Wythe	20217	479	17	1189	28
Frederick	20117	435	17	1183	25
Accomac	34795	502	32	1179	15
Arlington, including Alexandria	37697	32	32	1178	1
Henry	21062	444	18	1170	24
Shenandoah	20808	510	18	1156	28
Prince Edward	14997	356	13	1153	27
Loudoun	20577	519	18	1143	29
Nansemond	30450	423	27	1127	15
Culpeper	13292	384	11	1117	34
Alleghany	22229	458	21	1058	21
Albemarle, includ. Charlottesville	37121	751	37	1003	20
Montgomery	24031	401	24	1001	16
Dinwiddie, including Petersburg	53315	521	54	987	9
Warwick and N. N.	48041	69	50	960	1
Washington, including Bristol	39326	604	42	936	14
Bath	6389	545	7	912	77
New Kent	4541	191	5	908	38
Orange	13320	359	15	888	23
Spotsylvania, including Fredericksburg	16750	413	19	881	21
Augusta, including Staunton	46334	1006	54	858	18
Norfolk (County)	261881	414	334	784	1
Campbell, including Lynchburg	58754	557	77	763	7
Roanoke	81922	305	128	640	2
Henrico, including Richmond	207357	277	395	524	7
VIRGINIA	2423942	40262	2206	1098	18.2

The Leslie Dana Medal.

Mr. Leslie Dana, on retiring as chairman of the Missouri Commission for the Blind, in 1925, established a special fund to be utilized by the Missouri State Association for the Blind for the annual purchase of the Leslie Dana Medal for the Prevention of Blindness. In accordance with the terms of the gift, the National Committee for the Prevention of Blindness is to make the annual award under the following conditions:

a. Long meritorious service for the conservation of vision in the prevention and cure of diseases dangerous to eyesight.

b. Research and instructions in ophthalmology and allied subjects.

c. Social service for the control of eye diseases.

d. Special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision.

Nominations will be received by the National Committee for the Prevention of Blindness, 370 Seventh Avenue, New York City, together with detailed information prompting the nomination, until the 15th day of March, 1925.

The medical profession and ophthalmological societies are invited to submit names of persons deemed worthy of this honor under the conditions set forth above.

Child Labor in Canada.

A minimum age of fifteen for permanent gainful employment during the school year is urged for Canadian children by the Canadian Council on Child Welfare. The council also urges prohibition of night work for minors under eighteen and of employment in dangerous or unhealthful occupations of minors under twenty-one and an eight-hour day and forty-four-hour week for minors under eighteen.

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Proceedings of Societies

The Southside Virginia Medical Association

Met in South Hill, Va., December 8th, with a good attendance. An unusually good program was presented and all papers were freely discussed. The following officers were elected for 1926: President, Dr. F. C. Rinker, Norfolk; vice-presidents, Drs. Wright Clarkson, Petersburg; Richardson Joyner, Suffolk; W. W. Wilkinson, La Crosse, and William B. McIlwaine, Petersburg. Dr. R. L. Raiford, Sedley, was re-elected secretary-treasurer.

The Home Economics class of the South Hill High School served the visiting doctors a delicious course dinner, consisting of quail on toast and other good things.

The next meeting will be held on the second Tuesday in March.

The Bedford County Medical Society

Held a most interesting called meeting on December 10th, which was largely attended. The particular occasion of this meeting was to hear a lecture by Dr. James F. Cooper, Medical Director of the Clinical Research Department, of the American Birth Control League, who gave a splendid talk on the reasons for birth control. Dr. W. O. McCabe, Thaxton, is president and Dr. J. A. Rucker, Bedford, secretary of this Society.

The Warwick County Medical Society,

At its annual meeting on December 28th, elected Dr. Horace G. Longaker president; Dr. J. E. Marable vice-president, and Dr. Waverly R. Payne secretary-treasurer. This society meets in Newport News on the first and third Mondays.

The Danville Academy of Medicine,

At its annual meeting, elected Dr. W. W. Robertson, of that city, president, and Dr. W. B. Fowlkes, also of Danville, secretary. This society holds monthly meetings on second Tuesdays.

The Loudoun County Medical Society

Held its regular meeting at the home of Dr. J. E. Clagett, at Hamilton, on January 5, at which time papers were read by Dr. J. D. Rogers, of Washington, and Dr. W. O. Bailey, of Leesburg. Dr. Bailey is president, and Dr. W. C. Orr, of Leesburg, secretary of this Society.

The Arlington County Medical Society,

At its regular meeting in November, elected Dr. Henry A. Hornthal, of Potomac, president, and re-elected Dr. B. H. Swain, of Ballston, secretary-treasurer.

The Richmond Academy of Medicine,

At its annual meeting in this city, December 8, elected Dr. A. Murat Willis president for the ensuing year, and Drs. M. L. Anderson and George C. Woodson vice-presidents. Dr. Mark W. Peyser is the secretary-treasurer.

Book Announcements

The Art and Practice of Medical Writing. By GEORGE H. SIMMONS, M. D., Editor and General Manager Emeritus, American Medical Association, and MORRIS FISHBEIN, M. D., Editor, The Journal of the American Medical Association, Chicago. Press of the American Medical Association, 535 North Dearborn Street, Chicago, 1925. 163 pages. Cloth.

Drs. Simmons and Fishbein are so well known in the medical world for their ability as writers, that it seems only necessary to state that this book is a "gem." It is one which should be in the hands of all authors and publishers. It is practically a post-graduate course in the preparation and editing of articles for medical journals.

Thoracic Surgery. The Surgical Treatment of Thoracic Disease. By HOWARD LILENTHAL, M. D., Professor of Clinical Surgery at Cornell University Medical School; Ex-President of the American Association for Thoracic Surgery, etc. Philadelphia and London. W. B. Saunders Company. 1925. Two Octavo Volumes, totaling 1,294 pages, with 904 illustrations, 13 in colors. Cloth. Price, $20.00 for the two volumes.

Chemical Pathology. Being a Discussion of General Pathology from the standpoint of the Chemical Processes Involved. By H. GIDEON WELLS, Ph.D., M. D., Professor of Pathology in the University of Chicago, and in the Rush Medical College, Chicago. Fifth Edition, Revised and Reset. Philadelphia and London. W. B. Saunders Company. 1925. Octavo of 790 pages. Cloth. Price, $8.50.

A Text-Book of Medical Diagnosis. By JAMES M. ANDERS, M. D., Professor of Medicine, Medico-Chirurgical College, Graduate School of Medicine, University of Pennsylvania; and L. NAPOLEON BOSTON, M. D., Associate Professor of Medicine, Graduate School of Medicine, University of Pennsylvania. Third Edition, Entirely Reset. Philadelphia and London. W. B. Saunders Company. 1925. Octavo of 1422 pages with 555 illustrations, 21 in colors. Cloth. Price, $12.00 net.

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Editorial

Gastric Digestion.

The stomach does not digest food completely. The body is unable to use the food as it is when it leaves the stomach. Normal gastric digestion does not contemplate complete digestion. Digestion of food, when completed, is a process of change from alimentary food to blood and lymph food. This transformation is a process of digestion and absorption of food. It takes place in the alimentary tract only after gastric chyme has passed the upper reaches of the intestines. In thinking of gastric digestion one should think of the limitations of the word "digestion" remembering that the stomach has powers of only partial digestion. This partial digestion is brought about through two general processes. These processes are in the nature of a reduction of gross food particles into a fluid state, within a reasonable time, and the prompt ejection of this gastric chyme from the stomach into the gut where it is to be entirely converted, through completed digestion, into elements susceptible to absorption into blood and lymph channels.

Complementary to the treatment of the gastric secretory function, the food in the stomach relies upon the two-way motor function of the stomach. Here time is an important consideration. If the food is expelled by motor function too soon from the stomach, or if it is retained too long in the stomach through insufficient motor action, impaired digestion is the result. This may show itself, if of such a degree of severity, in a train of easily recognized symptoms. These symptoms may be of a gastric nature or they may be of an intestinal nature, or, probably, a combination of symptoms emanating from the stomach, intestinal tract, and other systems or regions of the body.

It is, hence, interesting to think of the elementary principles of the physiology of this organ and to recall some of the common sense aspects of problems involved in ordinary complaints of patients. Dyspepsia, so called, acute indigestion, upset stomach, disordered stomach, and like terms are expressions so frequently used by patients that it is a good idea to think of the work of the stomach in its daily duty of taking care of the foodstuffs introduced into it.

In connection with this we may look to the work of Martin E. Rehfuss who has done much to set us right on the stomach's part in digestion, and on the effect of certain foods upon the evacuation time of the stomach. Under the title "Normal Gastric Digestion," *J. A. M. A.*, Vol. 85, No. 21, page 1,599, one may find an interesting summary of present-day knowledge of gastric digestion. Until we get something better we may agree upon this as a fair statement of what we know "as of today."

Rehfuss succinctly gives his view in the following paragraphs:

"1. The whole tendency of gastric digestion is to produce fine comminution, or to translate a mass of heterogeneous substances into a more or less homogeneous mass. In a very different way, Meunier has attempted to demonstrate by means of cryoscopic index that the gastric contents are reduced to a certain optimum at which place active evacuation occurs. It is evident, therefore, that with the greatest diversity of foodstuffs the whole tendency of gastric digestion is to reduce them to a state of fine comminution and homogeneity.

"2. The stomach is undoubtedly a buffer or sentinel to the most deeply placed portions of the gastrointestinal tract; namely, the small bowel and the accessory organs of digestion, the liver and pancreas. It is in this portion that the true digestion and absorption of food occur.

"3. The stomach is a 'turnstile,' or, rather, the pylorus is the 'turnstile' for the entrance of food into the true digestive tract; and on the efficiency of this mechanism depends the decision as to whether material shall pass into the lower tract.

"4. The stomach shows an extraordinary adaptability to every variety of foodstuffs and, in my judgment, a selective activity to all varieties of food. In view of the great diversity of food products, representing practically every variety of animal and vegetable life, it is apparent that this little organ does an amount of true mechanical work that can only be appreciated when the whole series of foodstuffs are studied in their transition from their natural state to chyme. This was our work in studying the phenomena of normal digestion at Jefferson over a period of more than eight years, re-

garding the gastric digestibility of every variety of foodstuff. These studies emphasize more than anything else the extraordinary resilience and adaptability of the normal stomach in health, and associated studies have emphasized the intolerance of the stomach as probably the first evidence of disease."

Rate of Gastric Digestion

It seems from Rehfuss' studies that stomachs vary nominally in rate of evacuation and degree of acidity. Stomachs vary in gastric function in health. There is a normal "fast" and a normal "slow" stomach, measured by the evacuation time. The normally "fast" stomach becomes sick when it becomes a "slow" stomach, and the normally "slow" stomach may kick up symptoms when it becomes "fast" or too "slow." Rehfuss shows that normal fast stomachs "*digest*" beets, raw cabbage and lettuce in a little over an hour, turnips and asparagus in an hour and a half; raw carrots, creamed celery, plain cucumbers and string beans, in between one and one-half and two hours; eggs, bread, and cereals, around two hours; hamburger steak, minced ham and medium roast beef in two and one-quarter hours; lamb chops, roast beef, scrambled eggs and omelet in two and one-half hours; roast lamb, pork, in between two and three-quarters and three hours; liver, bacon, sirloin steak and ham bologna in a little over three hours.

The normal slow stomach shows a longer evacuation time on all foodstuffs, but all foods, in normal stomach, are evactuated before six hours; in other words, there is no actual six hour retention in all foods of moderate quantity in the normal stomach.

The observations of the secretory function are also interesting in this connection. Rehfuss found in 929 cases, that 91.5 per cent showed that fish gave an acidity of 100 or over; 76 per cent of meat preparation, 44 per cent of milk and cream preparation, 39 per cent of pies, puddings, and pastry and only 7.3 per cent of bread and cereal responses were in excess of 100.

It seems clear that in health there is a wide range of variation in secretory and motor function. In the presence of gastric symptoms the evaluation of the power of gastric function, must be made with this in mind.

Investigation of the Abnormal Stomach

In view of the frequency of "stomach trouble" as a cause of sickness and disability, and of the evident importance of the part played by the stomach in the preparation and partial digestion of the food for the ultimate use of the body, comment upon investigation of gastric function may be made here.

In all cases of "stomach trouble" careful history taking and physical examination assumes paramount importance. Careful inquiry into the habits of the patient, the food, the time, the environment, and other obvious conditions of feeding are indicated. One may find this inquiry tedious, but it is fruitful in the leads it offers. The physical examination of "stomach cases" is also important and should be conducted with great care.

But to gastric analysis and the roentgen-ray we must turn for the most useful and accurate means of investigation into abnormalities of gastric function. Rehfuss cogently observes that "gastric analysis is a physiologic study of gastric work; it is an attempt to throw light on gastric function. Many observers see in it no other purpose than a determination of the acid values, when in truth the determination of acid values is but a single evidence of one of the mucosal functions." Gastric function is combined secretory and motor work; a chemical determination of its workings is only one of the factors of function. Gastric analysis for diagnostic purposes is conducted as an inquiry into the behavior of the motor function as well as the secretory function during the course of a standardized meal of simple food. It attempts to throw light upon chymification and food evacuation, upon pyloric function, and gastric retention.

The roentgen-ray gives the anatomic evidence in diagnosis of stomach disease. The X-ray study of the stomach, where symptoms and gastric analysis indicate its use, is employed to determine the form, size, position and alterations in the stomach; not to speak of peristaltic action and evacuation time.

In the use of all diagnostic methods one must remember the variations of the normal stomach and the evidence received must be thrown against the background of symptomatology and history of the case under investigation. One must remember also that the acid curves and the evacuating time of the stomach being studied should be interpreted in the light of the test meal use, the preparation and environment, the pathologic conditions, mucus, blood and bile. By means of fractional gastric,

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sampling of the contents of a stomach as it works itself through the phases of gastric digestion, especially in the face of self-asserting symptoms from the stomach, one may secure valuable evidence in diagnosis. The chemical study of samples of gastric chyme during stomach digestion, with a breakfast of simple nature; the period of time required for the stomach to evacuate the meal, the nature of the content secured in the fractional tappings, all enter into the inquiry as to the cause and nature of the gastric complaint. Fractional gastric examination is an attempt to measure the ability of the organ to function or to find out wherein it fails in its function, besides getting sidelights for additional study.

Heart Sounds.

Every practitioner is interested in the heart sounds. Auscultation first seeks the heart sounds. Heart murmurs must be given the "deaf ear," until one has "listened in" on the heart sounds. The heart sounds are signals of heart function. The first and second sounds of the heart stand out as "fixed points." The making of the heart sounds and the time relation of the heart sounds, the quality and nature of the heart sounds, the auscultation and suppression of the heart sounds, the relation of murmur to the heart sounds, are all important considerations.

The two heart sounds mark the beginning and the ending of ventricular systole. This fact should be remembered as one "listens-in" on the heart. The first sound, beginning with the closure of the auriculo-ventricular valves, the tightening of the valve cords and contraction of ventricular walls, is deeper in pitch and longer than the second sound in duration. The second sound, occurring with the completion of ventricular systole, is at a higher pitch and of a shorter duration and is created by vibrations occurring in the closure of the semilunar valves. The first sound is truly systolic in time and the second sound is diastolic. A third heart sound has been noted (Thayer). It is described as "softer and of a lower pitch" than the second sound and is heard just after the second sound. It occurs only in diastole and it is thought to be due to a vibration of the auriculo-ventricular valves, caused by the sudden in-rush of blood from the auricles at the beginning of the diastole, occurring 0.13 seconds after the beginning of the second sound. One should remember that the two sides of the heart acting synchronously make up the heart sounds; although re-duplication of the elements of the sounds are occasioned by disassociation of left and right contraction.

Abnormal sounds of heart sounds should be understood or interpreted by physicians by means of auscultation. One remembering the nature, quality, time relation, and position of best interpretation of normal heart sounds is enabled the better to evaluate abnormal heart sounds and to ascribe to changes of quality, intensity, rate, and intermissions, associations with other sounds in or about the heart, a truer meaning. Diminuition of the intensity of the first sound at the base is to be considered as a sign of heart weakness or myocardial weakness, especially if the heart is beating fast; while increase of the intensity of the first sound, at the apex, if pronounced, may be taken as a sign of mitral stenosis, if other signs are confirmatory. The second sound accentuation is also interesting. The accentuation of aortic second sound indicates aortic changes. These aortic changes may be due to tension on valves, in sclerosis and hypertension; also at the second pulmonic, the accentuation may be of interest in pneumonia, chronic diseases of the lungs, or pleura. The suppression or the diminuition of heart sounds may come about by organic lesions at the valves, or myocardial degeneration, or accumulation of fluid in the sacs about the heart.

The quality or timbre of heart sounds should also engage the interest of the practitioner. This changing of heart sounds as to quality is especially exemplified during the course of endocarditis. Muffling is a common quality of heart sounds in endocarditis; this may appear suddenly, may appear and then disappear, or may fade into and become a heart murmur. After every case of acute infection, particularly of the rheumatic type, heart sounds should be studied daily for the first evidence of muffling. No patient should be permitted to arise from bed after tonsillitis or rheumatic fever, for example, without a careful study of heart sounds.

Reduplication of heart sounds, also, gives to the examiner a problem for interpretation in cardiac function. The doubling of the first sound is almost always significant of important pathological changes in the heart. The pre-

ponderance of right over left ventricular action, or the disorder of conduction in the bundle of His, the dilatation of heart muscle, may be linked up in the observation of reduplication of the first heart sound. Likewise with the doubling of second sound, one may infer that there is a disassociation of the two elements which make up the second sound.

Heart Murmur

Laennec, 1819, according to Vaquez, believed that these sounds were always caused by valvular lesions. Now we recognize murmurs in the examination of the heart which are not due to organic lesions of the valves. Organic murmurs are caused by chronic lesions of the valves, or an abnormal opening between cavities of the heart. For instance, a systolic murmur at the base in the second right intercostal space indicates an aortic stenosis. This lesion is calculated to transmit this murmur along the course of the vessel of the neck. Now, if one hears a diastolic murmur in the second interspace on the right side, aortic insufficiency may be interpreted. Although the same lesion may give a diastolic murmur behind the sternum at the level of the third rib; it is transmitted downward to the apex.

One should not forget that a double murmur denoting an insufficiency and a stenosis, at the valve, may be heard partaking of a diastolic and systolic quality. In such a double lesion, as one runs the stethoscope downward to the zyphoid, the quality of the diastolic murmur increases and that of the systolic diminishes in aortic insufficiency and stenosis combined.

Always at the apex a systolic murmur, transmitted to the left, denotes mitral insufficiency. The diastolic murmur of mitral stenosis is heard along the left border of the sternum about the fourth rib. These illustrate the left side lesions of the heart which give forth murmurs. The heart functions can not be judged by heart murmurs.

Functional murmurs arise in mechanics in very much the same way as organ murmurs but from an entirely different cause. The pathogenesis of functional heart murmurs is entirely different from that of organic heart murmurs, but function murmurs are due to insufficiency.

Periodic Physical Examination.

In order to put across this important program in preventive medicine, medical organizations should begin the education of the public by means of newspapers, magazines, circulars, placards, and radio, as to the advantages and benefits to be derived.

Assuming that the profession is ready to make satisfactory examinations, the next step is to secure the widespread adoption of the plan by the laity.

The profession in its organizations must assume the responsibility of saying that its members are prepared to perform this public service. The members of societies should "take a course" in standard physical examinations in order to attain a proper degree of aptness, proficiency, skill, and thoroughness, that makes an examiner of this sort "a specialist."

The so-called "health examination" goes far afield in physical inquiry. To examine an infant, one needs some special study; to examine a child, one needs also some special study; to examine a youth, male or female, one requires some special knowledge; to examine a middle-aged man or woman—or old men or women—likewise demands some special knowledge not required in other grades of life or other classes of examination. The interrogatory parts of these examinations are very different in requirements and uses. The whole question of examination of persons—whether infant, youth, middle age or old age subjects—needs to be gone into systematically by doctors proposing to perform this new service for the public. General practitioners must become "specialists" in the *periodic health examinations.*

Read Surgeon-General Cumming's paper on the subject of periodic physical examinations which appears as the leading article of this issue of the *Monthly.* This is a live subject and opens up a new and important field of effort in preventive medicine as well as in the ordinary practice of medicine.

If the general practitioner or family physician will see the big opportunity which the program offers for usefulness, as well as for increased professional advantage, he will join in supporting the new movement which is assuming telling proportions in preventive medicine throughout the country.

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News Notes

1926 Program of the Gorgas Memorial.

The Gorgas Memorial purposes to make 1926 Health Conservation Year, during which an intensive campaign through the newspapers, magazines, radio, moving pictures, clubs and other gatherings will be conducted to promote an interest in better personal health. Every citizen in the United States will be urged to set aside one day during the year—preferably his birthday—to go to his personal physician and have a health examination.

A national mosquito abatement campaign will be conducted, in which the public will be urged to co-operate with all health agencies in eradicating disease-carrying and pestiferous mosquitoes.

Arrangements are being negotiated to begin the tropical research program during 1926. The work will be conducted in laboratories, the use of which has been tendered the Institute, pending the construction of its own building.

Co-operation between the public and scientific medicine will be encouraged, and a public opinion receptive to proper health instruction developed.

Organization of State Governing Committees will be steadily extended and every effort put forth to complete the committee membership quotas as rapidly as possible. Our present members are asked to aid in this direction by interesting their associates and other representative medical and laymen and women in the Memorial, and urging them to enroll in the State Governing Committee.

The American Congress on Internal Medicine

Will hold its tenth annual meeting at Detroit and Ann Arbor, Mich., the week of February 22-27, 1926, under the presidency of Dr. C. G. Jennings, of Detroit.

The Congress is devoted to amphitheatre, bedside and clinical laboratory demonstrations as well as to symposia dealing with modern phases of internal medicine. Distinguished guests from abroad, Canada and the leading clinics of the United States will occupy prominent places on the program. Four days will be devoted to the work at Detroit and on one day, the society will be the guest of the University of Michigan at the newly opened eleven hundred bed University Hospital.

All physicians, who are interested in internal medicine and who are members in good standing of their local and national societies are cordially invited to attend the Congress.

Hotel headquarters will be at the Book-Cadillac, in Detroit. Information regarding reduced railroad rates, program, hotel accommodations, etc., may be secured from the Secretary-General, Frank Smithies, M. D., 920 N. Michigan Avenue, Chicago, Ill.

The Tri-State Medical Association of the Carolinas and Virginia

Is to hold its annual meeting in Fayetteville, N. C., February 16th and 17th, with headquarters at the Prince Charles Hotel. These meetings are always interesting and pleasant and the usual good attendance is expected this year. Dr. F. H. McLeod, Florence, S. C., is president, and Dr. James K. Hall, Richmond, Va., secretary.

Married.

Dr. Frank McConnell Leech, Lexington, Va., and Miss Bess McDowell Dunlap, of Kerrs Creek, Va., December 29th.

Dr. Osbourne O. Ashworth, Richmond, Va., and Miss Mary Wells Knight, of Plant City, Fla., December 16th.

Dr. Paul Crenshaw Colonna, of New York City, but a former Virginian, and Miss Frances Pierpont Isham, of New York and Vermont, September 5, 1925.

Dr. Thomas Ruffin Pratt, Jr., Blue Ridge Sanatorium, Charlottesville, Va., and Miss Lula Emma Jackson, University, Va.

Dr. Joseph Hamilton Smith, Edwright, W. Va., of the class of '21, University of Virginia, and Miss Hester Jane McLarren, Osceola Mills, Pa., September 9th.

Dr. Albert A. Cannaday and Miss Claudine Marie Day, both of Roanoke, Va., October 24.

General Education Board Makes Appropriation to University of Virginia Medical School.

An appropriation of $700,000, by the General Education Board, of New York, to University of Virginia Medical School, was announced at a faculty meeting on December 8th, by President Edwin A. Alderman. This sum was appropriated for the purpose of erecting buildings and providing equipment for the housing of the medical sciences at the University of Virginia and for properly relating those sciences to the hospital and clinical services

already at that Institution. This sum was appropriated toward a total of $1,400,000 adjudged necessary to carry forward the whole program of construction after consultation with Charles A. Coolidge, of Boston, America's foremost architect in this field.

It was further announced that an additional sum of $450,000 would be raised by the University, making a total of $1,150,000. The State of Virginia would then be asked to complete the amount required by legislative appropriation of $250,000. This amount—just over one-sixth of the total amount—was the key to the whole big undertaking, for without such legislative action the $700,000, from the General Education Board and the $450,000, by private gift, it would be impossible to secure, unless the State is willing to do this relatively small part. It is thought that the State will unquestionably make the appropriation in the interests of its own welfare for the promotion of public health and medical science, and for the purpose of placing the medical department of the University in line with the developments in medicine and in company of the great modern medical schools of America.

Dr. and Mrs. H. L. Burwell

Have returned to their home in Chase City, Va., after a visit to friends in Roanoke, Va.

Recent Visitors to Richmond.

The following are among the Virginia doctors recently noted in Richmond: Drs. Charles F. Graham, Wytheville; Dr. Percy Harris, Scottsville; Dr. I. K. Redd, Atlee; Dr. W. Massie Tunstall, Lovingston; Dr. T. N. Davis, Jr., Lynchburg; Dr. C. E. Peyton, Pulaski; Dr. Rachael F. Weems, Harrisonburg.

The Congress on Medical Education, Licensure, Hospitals and Public Health

Will hold its annual meeting at Congress Hotel, Chicago, February 15th, 16th, 17th and 18th, a month earlier than usual. An interesting program is being planned on the various subjects.

Dr. N. W. File,

Of Lynchburg, Va., spent the holidays with his parents at Ransons, Va.

Dr. F. X. Schuller,

Of the class of '15, Medical College of Virginia, formerly of Hiawatha, W. Va., is now practicing in Huntington, W. Va., with offices at 2544 Eighth Avenue.

Members of Medical College of Virginia Staff.

At the last meeting of the Board of Visitors of the Medical College of Virginia, Richmond, Dr. Dean B. Cole was appointed associate in medicine, and Dr. P. E. Schools, Dr. Powell Williams and Dr. W. T. Vaughan were appointed instructors in medicine.

Posture Standards Shown by Charts.

The Children's Bureau of the U. S. Department of Labor will shortly issue a set of six charts on posture standards for boys and girls, intended for the use of physicians, nurses, physical education teachers, and clinics. Three types of figures are shown for both boys and girls—the thin, the intermediate, and the stocky. Each chart shows four silhouette figures illustrating excellent, good, poor and bad posture for the respective types of boys or girls.

Each chart is approximately 24x34 inches. A limited number are available for free distribution; others may be secured from the Government Printing Office, Washington, D. C., at 50 cents for the set of six, or 25 cents for the set of three charts on girls or the set on boys.

Dr. Stephen H. Watts

Has resumed his work as professor of surgery and gynecology at the University of Virginia, after a visit of three months in Europe.

Plan for Holding Orthopedic Clinics.

Late in December a number of orthopedic surgeons met with Governor Trinkle and State Health Commissioner Williams for the purpose of discussing ways and means for extending orthopedic work in Virginia. The following committee was appointed to draft plans for the holding of orthopedic clinics in the State of Virginia; Dr. Ennion G. Williams, chairman; Dr. W. L. Harris, Norfolk; Dr. J. C. Flippin, of the University of Virginia, Medical School; Dr. W. T. Sanger, of the Medical College of Virginia; Dr. Allen Voshell, University; Dr. J. T. Mastin, of the State Department of Public Welfare; and Mr. D. M. Blankenship, of the Rehabilitation Board.

Dr. W. J. Wigington,

Of Java, Va., left early in January for a business trip of several weeks to Miami, Fla.

Dr. Fred M. Hodges,

Richmond, was appointed chairman of the Section on Radiology of the Southern Medical

Association for the coming year, at its recent meeting in Dallas, Texas.

Dr. Isaac A. Abt,

Chicago, announces that he has been appointed attending physician in diseases of children at St. Luke's Hospital, that city. He entered upon active service there the first of this year.

Dr. David T. Gochenour,

Stuarts Draft, Va., was recently elected a member of the Board of Trustees of Bridgewater College, at Bridgewater, Va.

Dr. Watson Rankin,

Of Raleigh, moved to Charlotte, N. C., the first of this year, where he has established headquarters for his work as director of the Hospitalization and Orphanage sections of the Duke Endowment.

Dr. F. M. Hisey,

Edinburg, Va., has returned home, after spending several weeks at Winchester Memorial Hospital, where he was under treatment.

Dr. J. B. Hackley

And family, of Purcellville, Va., visited friends in Culpeper, Va., last month.

Dr. George H. Snead,

Of Lexington, Va., spent the holidays at his former home in Fork Union, Va.

The Southern Surgical Association

Held the largest meeting in its history in Louisville, Ky., December 15th, 16th and 17th, under the presidency of Dr. Irvin Abell, of Louisville. It was decided to hold the 1926 meeting in Biloxi, Miss., about the middle of December. Dr. H. A. Royster, Raleigh, N. C., for many years secretary of the Society, was elected its president; Drs. Louis Frank, of Louisville, and Frank K. Boland, of Atlanta, Ga., vice-presidents; Dr. R. L. Payne, Norfolk, Va., secretary; and Dr. Urban Maes, New Orleans, treasurer.

Clinic on Wheels, Los Angeles.

A complete clinic on wheels is the latest addition to the equipment of the department of health of the Los Angeles Board of Education. The clinic is provided with complete sets of optometrists' and dentists' fixtures, thus eliminating the expense of furnishing these sets for the separate schools. By use of the movable clinic, two physicians and one nurse can look after the welfare of many children each day.

Children in Moving Picture Studios.

Recent inquiries of the International Labor Office about the employment of children in motion pictures in various countries show the following facts: France has no special legislation regulating the employment of children in this industry, but provisions of the general labor code apply; in Switzerland, the cinema industry does not exist; in Germany an amendment to the child-labor law is proposed to cover the taking of public and private moving-picture films, and Berlin already has municipal regulations on this subject; in Great Britain there is no special legislation affecting children in such work and such employment is not common, but certain provisions of the Education Act restrict the employment of children under fourteen and give local authorities power to make by-laws prohibiting the employment of children in any specified occupation or regulating their employment generally; in the United States, the industry is concentrated chiefly in California and New York, where permits are required for the employment of children at this work.

Honor Dr. Dean Lewis.

A dinner has been arranged for January 22, in honor of Dr. Dean Lewis, recently appointed professor of surgery at Johns Hopkins University, and surgeon-in-chief to the Johns Hopkins Hospital, Baltimore. Surgical alumni of that school and a number of prominent surgeons have been invited and a series of clinics will be held. It is probable that a movement will be started at this time looking to the organization of a society to be known as the Johns Hopkins Surgical Society.

Dr. George M. Kober,

Washington, D. C., was re-elected president of the Washington Tuberculosis Association, at its annual meeting, held recently.

Dr. A. H. Deekens

Has just returned to his home in Richmond, after a visit to Florida.

Dr. Henry T. Miller,

Formerly of Staunton, Va., but for the past few years of Washington, D. C., has moved his offices to the new Washington Medical Building, 1801 Eye Street, Northwest, where he will continue the practice of ear, nose and throat work.

The District of Columbia Medical Society,

At its annual meeting in Washington, De-

cember 2, elected the following officers for the ensuing year: President, Dr. Joseph S. Wall; vice-presidents, Dr. Charles S. White and Dr. Amelia Frances Foye; delegate to the American Medical Association, Dr. William Gerry Morgan; secretary-treasurer, Dr. Coursen B. Conklin, re-elected.

The National Committee for the Prevention of Blindness,

At its annual meeting in New York City, November 30 to December 5, inclusive, had a program which was divided into several sections in which were discussed many matters in relation to the conservation of vision.

At the director's meeting, Dr. William H. Wilmer, director of the William Holland Wilmer Foundation, Johns Hopkins University, pointed out that, although the activities of the National Committee had been responsible for cutting down birth infections causing blindness some fifty per cent, there was yet much to be done. As a result of Dr. Wilmer's address, a resolution was adopted appealing to Congress, in behalf of the 14,500 persons represented in this organization, for better support of the national bureaus striving to eliminate trachoma.

Dr. W. W. Buck,

Formerly of Rural Retreat, Va., has been appointed an assistant physician at the Western State Hospital, Staunton, Va., and has entered upon his duties there.

Dr. Kon Wyatt,

Recently of Fordwick, Va., has moved to Canon City, Colorado, where he is continuing the practice of his profession.

Principal Causes of Death in 1924.

In the death registration area of the United States there were reported 1,173,990 deaths during the year 1924, which gave a death rate of 11.9 per 1,000 population as compared with 12.3 in 1923. Nearly three-fourths of the decrease in 1924 is caused by the decrease in number of deaths from influenza and pneumonia. Slight increases were shown over 1923 in the death rates from diseases of the heart, cancer, and automobile accidents.

Dr. Lucy S. Hill,

Of the class of '24, Medical College of Virginia, who recently completed an internship at St. Elizabeth's Hospital, Washington, D. C., has been appointed a member of the staff of the bureau of child hygiene, infancy and maternity division of the Louisiana State Board of Health.

Dr. J. B. Harvie Waring,

Blanchester, Ohio, has been elected post commander of Marion Post No. 179, American Legion of Ohio, for the year 1926. Dr. Waring has also been invited to address the Eye, Ear, Nose and Throat Section of the Ohio State Medical Association at its coming meeting in Toledo, Ohio, on "Modern Tonsillectomy Methods."

Dr. J. Shelton Horsley,

Richmond, addressed the Wayne County Medical Society in Detroit, Mich., December 21, his subject being "Biologic Principles Underlying Gastric Surgery."

Dr. Robley R. Goad,

Of the class of '25, Medical College of Virginia, after a short time at St. Francis Hospital, Jersey City, N. J., is at present at Richlands, Va.

Dr. Charles E. Dyer,

Who for the past three and a half years has been located at Jewell Ridge, Va., as physician and surgeon to Junu Ridge Coal Corporation, has resumed private practice at his old home in Pulaski, Va.

Dr. Dyer was succeeded at Jewell Ridge by Dr. A. M. Largey, a graduate of the University of Pennsylvania.

Annual Report of U. S. Public Health Service.

Surgeon General Cumming, in his annual report of the U. S. Public Health Service, for the fiscal year ending June 30, 1925, urges the maintenance of the present high standards in public health work. Preliminary figures indicate a total death rate for the United States for the calendar year 1924 of about 11.9 per 1,000 as compared with 12.4 for the previous year. While infant mortality has shown an appreciable decrease, the number of deaths of mothers incident to childbirth has shown little change for the last nine years. The death rate from the operation of automobiles has risen from less than one per 100,000 in 1906, to nearly fifteen per 100,000 in 1923. Reports show a large number of persons killed and injured as result of Fourth of July celebrations. Heart disease ranks first in the United States as a cause of death, and influenza and pneumonia holds the second place. Diphtheria death rate has shown a striking decrease.

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Many experiments have been carried on in the interest of health work and the service has been especially active in its work along preventive lines. An important event in the field of international health relations was the signing of the Pan-American Sanitary Code by eighteen of the American republics at Havana. This pact provides for the collection and distribution of information concerning the prevalence of communicable diseases and prescribes and standardizes the measures necessary to prevent their transmission from one country to another.

"Frozen Endowments."

Physicians and surgeons of New York and the nation have joined forces against "frozen endowments"—funds permanently dedicated to restricted objects and endangered by obsolescence as those particular purposes become antiquated. It is urged by this group that endowments for medical research, treatment or education, be kept free from narrow limitations and rigid conditions, so that the purpose of the giver may not be defeated by changing times. In New York, a Community Trust has been formed. Various financial institutions agree to invest and hold the principal of endowments but to disburse the income only as directed by a central Distribution Committee. This committee executes the wishes of the original founders, and has power to effect such amendments in the provisions of the grant as may be made advisable by unforeseen changes in conditions.

This Community Trust idea seems a most excellent arrangement for handling large bequests and endowments, that they may not become "frozen."

Dr. Frank P. Brammer,

Formerly of Callaway, Va., is now located at Christiansburg, Va.

Dr. H. L. Mitchell,

Lately of Danville, Va., has located in Lexington, Va., where he is specializing in diseases of the eye, ear, nose and throat. Dr. Mitchell returned to this State the first of last year after doing special work at the Episcopal Eye, Ear and Throat Hospital, in Washington, D. C.

Healthy Recreation as the Enemy of Venereal Disease.

The British Government has become fully alive to the gravity of the problem of the venereal diseases and to the importance of doing everything possible for the improvement of the public health in this respect. This is evidenced by the Government's changed attitude of apparently hushing up the evil as late as 1911 to the spending of nearly 400,000 pounds in 1924 in improving the health of the country through venereal disease control measures.

The Surgeon Commander, of the British Navy, as a means of reducing the number of sick days in the British Navy from venereal diseases, insists that everything possible should be done to provide healthy recreation for seamen on leave.

The Church Hill Medical Society,

A local medical society of Richmond, Va., at a recent meeting, elected Dr. J. W. Hannabass president for the coming year; Dr. W. H. Whitmore, vice-president; Dr. R. S. Faris, secretary-treasurer; and Dr. M. L. Boyle, reporter. At this meeting, Dr. B. M. Rosebro, of Richmond, read an interesting paper. Following the business meeting, the members were entertained by Dr. J. Gordon Boisseau at whose office the meeting was held.

Dr. Robert Spilman

Has returned to his post as medical adviser at the Virginia Military Institute, Lexington, after a sick leave of several weeks.

Civil Service Examinations.

The U. S. Civil Service Commission, Washington, D. C., announces open competitive examinations for the following: Trained nurse and trained nurse (psychiatric), receipt of applications to close January 30; physiotherapy aide, physiotherapy pupil aide, and physiotherapy assistant, receipt of applications to close January 9th, February 13th, March 13th, April 17th, and May 15th; dietitian and also occupational therapy aide and cocupational therapy pupil aide, applications for these to be rated as received until June 30th.

Orthopaedic Clinics in North Carolina.

The State Department of Vocational Rehabilitation, Raleigh, N. C., has established Orthopaedic Clinics over that state for the purpose of caring for the indigent cripple. Dr. Alonzo Myers, Orthopaedic Surgeon, of Charlotte, N. C., is in charge. Clinics have been established at Fayetteville and Charlotte, N. C., and 151 cases have been examined.

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Dr. Stuart Michaux.

Richmond, Va., spent sometime in December in attending the Mayo Clinic, Rochester, Minn.

Dr. Goodlatte B. Gilmore,

Formerly of Norfolk, Va., after a post-graduate course in New York City, has located at 2940 Grand Concourse, that place, and will limit his practice to diseases of the ear, nose and throat, with hospital appointments at the Post-Graduate, Department of Otology, and at the Bronx Eye and Ear Infirmary.

Dr. and Mrs. J. C. Blanton

Returned to their home just outside of Richmond, the middle of December, after a visit to New York City.

Dr. Ernest M. Wilkinson,

Of the class of '23, Medical College of Virginia, after practicing for a time at Dan, W. Va., has moved to Welch, W. Va., where he is associated with Dr. H. G. Camper.

West Virginia in the Birth-Registration Area.

West Virginia is in the 1925 birth and death-registration area of the United States, the Census Bureau announces. The birth-registration area now includes thirty-three States and the death-registration area forty-one.

Child Labor Draft Conventions.

Chile and the Irish Free State have ratified several of the child labor draft conventions of the International Labor Conference. Chile is the first Latin-American country to ratify. The conventions provide, among other things, that no child under fourteen shall enter industry and that no child under eighteen shall do industrial work at night.

Tuberculosis Campaign, Switzerland.

Switzerland plans a campaign against tuberculosis, especially against the disease in children. Medical supervision over tubercular persons, welfare stations, and colonies for children suspected of the disease are included in the plans.

Annual Report of Surgeon General of U. N. Navy.

The report of Surgeon General Stitt for the fiscal year 1924, indicates that there were fewer admissions to the sick list and less disability from sickness in the Navy that year than in any year since the World War. Venereal diseases were responsible for a large part of the disability caused by all classes of disease, especitlly in the case of ships, which were for long periods of time in Chinese and other foreign ports. The annual physical examination of officers, the first to be held under the new plan, served to detect many early defects among those examined and made it possible to suggest remedies looking to their correction.

Dr. Harry F. White,

Fishersville, Va., narrowly escaped serious accident, the middle of December, when he was thrown from his automobile. The sudden explosion of a tire while the car was in motion, caused Dr. White to lose control of the car, which subsequently upset. While suffering acutely from shock and bruises, Dr. White was not otherwise hurt.

Dr. Homer S. Henkel

Has resumed his practice in Staunton, Va., after an absence of several months on account of illness.

The Physicians' Home.

The campaign still continues for funds for that most worthy cause—the Physician's Home. A statement recently issued by the committee in charge of this enterprise stresses especially the gratuitous service rendered by physicians, either through their voluntary service or through clients failing to pay the doctors' bills. The Physicians' Home has been established as a home to which a physician and his wife may retire when health fails, so that the doctor is not able to keep up his work and he has nothing stored up with which to help in old age.

If you will make a contribution to the establishment of this home, your check should be drawn to the order of the Physicians' Home, Inc., and mailed to Dr. Albert G. Weed, Treasurer, 22nd Floor, Times Building, Broadway and 42nd Street, New York City.

Ensworth Medical College Alumni Organize.

The Alumni Association of Ensworth Medical College was formed in Kansas City, Mo., in October, with a membership of forty-three. Dr. Charles Geiger, of St. Joseph, Mo., was elected president, and Dr. Chas. Wood Fassett, 115 East Thirty-first Street, Kansas City, Mo., secretary. It is desired to enroll all graduates of Northwestern, Central and Ensworth Medical Colleges. Dues are $1.00 a year. Graduates of all three schools are urged to send their names to the secretary for enrollment at once, as it is hoped to have an attendance of one hundred at the meeting next fall.

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The Association of Seaboard Air Line Railway Surgeons

Held its twenty-second annual meeting in St. Petersburg, Fla., December 1, 2 and 3. There was an attendance of over 150 at this meeting. Dr. Joseph M. Burke, Petersburg, Va., is chief surgeon. He acted as toastmaster at the banquet tendered the members, their wives and friends, at which talks were given by several officials and surgeons. The banquet was one of the most brilliant social affairs in the history of the organization. Business sessions were held the first day and the rest of the time was given to sight-seeing and entertainments. At the scientific session, the *International Journal of Surgery*, as is its custom, awarded three prizes for the best papers presented. The first of these went to Dr. H. Aulick Burke, Petersburg, Va., for his paper on "Gas Gangrene."

Dr. W. T. Graham, Richmond, Va., was elected president of the Association; Drs. T. J. McArthur, Cordelia, Ga., Ralph Green, Jacksonville, Fla., J. E. Rawls, Suffolk, Va., vice-presidents, and Dr. J. W. Corbett, Camden, S. C., member of the executive committee. Havana, Cuba, was selected as the 1926 place of meeting.

Dr. Ruth Mason,

Of Stony Creek, Va., of the class of '25, University of Virginia Medical School, after several months at Metropolitan Hospital, New York City, is now a resident physician at Petersburg Hospital, Petersburg, Va.

Dr. R. T. Akers,

Alum Ridge, Va., was elected chairman of the Floyd County School Board, at its meeting held last month.

Dr. Chester E. Haberlin,

Of the class of '24, Medical College of Virginia, has just completed a year's internship at Metropolitan Hospital, New York City, and has been appointed night surgeon to the Emergency Hospital of the City of Bridgeport, Conn., his home town. He has opened an office at 324 Carroll Avenue, that city, for private practice during the day.

Dr. J. M. Holloway,

For some time of Port Royal, Va., having recently completed a course at the graduate school of medicine, University of Pennsylvania, has located in Fredericksburg, Va., with offices at 305 George Street.

Rabies Apparently on Slight Increase.

In view of a slight increase in the number of cases of rabies reported in Virginia, for the November-December period, the State Board of Health advises that when a person is bitten, the dog need not necessarily be killed, but should be tied up. If it has rabies, it will die within a few days. Antirabic treatment may be instituted without waiting to know the fate of the dog, and especially should this be done, if the person is bitten about the head or neck, as the nearer the bite is to the brain, the sooner will rabies develop.

Antirabic treatments are kept at all times at the State Laboratory, in Richmond, Harrisonburg and Norton. Should the dog die or be killed, the dog's head should be sent at once to the nearest State Laboratory for examination. If the dog lives or the head shows no rabies, the antirabic treatment may be discontinued after the first series is taken.

Dr. Prichard Hurt in Accident.

As a result of his automobile being struck and demolished at a railroad crossing in the snow storm on the night of January 8th, Dr. W. I. Prichard, of Petersburg, Va., is in the Petersburg Hospital with a broken leg and suffering from bruises and cuts. His escape from death is considered miraculous.

Southside Community Hospital.

Residents of Farmville, Va., and vicinity held a drive from January 8th to the 13th, to raise $60,000—one-third of th cost of the building and equipment of this 50-bed modern hospital. The Commonwealth Fund of New York will pay $120,000 for this, their first rural hospital which is given as part of their general plan for medical health education. Provision has been made for maintaining the hospital when completed.

For Sale or For Rent.

Because of the untimely death of Dr. George T. Divers, the St. Martin's Hospital, Stuart, Virginia, offers an excellent opportunity for some doctor and surgeon.

The building has all modern equipment, steam heat, electric lights and water, beautiful grounds, adequate room for forty patients, rooms with or without bath. It is located near the corporate limits of the town of Stuart, in one of the most beautiful and healthy sections of the Blue Ridge. Fire-proof building erected in 1923.

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For particulars, write R. Paul Sanford, Attorney, Stuart, Virginia.—(Adv.)

Obituary

Dr. Stephen Harnsberger.

A former president of the Medical Society of Virginia and one of the most beloved and prominent physicians of Northern Virginia, died at a Washington Hospital, January 1st and was buried at Catlett, Va., where he lived and practiced for many years.

Dr. Harnsberger was born in Augusta County, Va., July 5, 1852, and received his early education at Bethel Military Academy and Emory and Henry College. Upon completion of his academic work, he studied medicine at the College of Physicians and Surgeons, Baltimore, and the Kentucky School of Medicine, Louisville, graduating from the latter in 1877. He later took post-graduate work in Baltimore.

Dr. Harnsberger joined the Medical Society of Virginia in 1893 and had attended nearly all of its sessions since, taking interest in all of its activities. He was a member of numerous medical organizations, being a charter member of and especially active in the Medical Society of Virginia, Maryland and the District of Columbia. He was for ten years an associate editor of this journal and contributed many papers to its pages, was one of the medical examiners for the draft board during the World War, was a local surgeon for the Southern and the Chesapeake and Ohio Railways, and, at the time of his death, was coroner of Warrenton, Va., to which place he moved several years ago.

Dr. Harnsberger is survived by several sons, his wife and only daughter having died during the "flu" epidemic.

Dr. William Morgan Smith,

President of the State Board of Health of Virginia and Executive Secretary of the Virginia Tuberculosis Association, died suddenly at his home, Rosemont, near Berryville, on the afternoon of December 22nd. With the passing of Dr. Smith to his reward the State has lost a devoted and patriotic citizen; the medical profession, a skillful surgeon and physician; the public health service, a scientific and wise administrator; Virginia, a courteous gentleman representing its best traditions; and his friends, a true and loyal companion.

Dr. Smith was descended fom a long line of ancestors distinguished in every crisis of American history. In him was blended the splendid qualities of his ancestors. They were soldiers, educators, statesmen and physicians. At Jamestown may be seen the tombs of the Jacquelins, his first American ancestors. His great grandfather was Major General John Smith, of the Revolution. His grandfather, Colonel Augustine Smith, fought in the war of 1812. He, himself, was a surgeon in the Spanish-American War and was later a colonel in the line. He commanded the troops in Richmond which quelled the riots in the strike of 1902. He was offered the position of adjutant-general of the Virginia Militia, but declined, preferring to devote himself to his extensive practice in Alexandria. He was surgeon to the Southern and the Richmond, Fredericksburg and Potomac Railways at Alexandria and at one time conducted a private hospital there.

Just before the World War he accepted the postmastership of Alexandria, believing that it would take only a part of his time. However, the war coming on soon afterwards, he was given the additional supervision of the postal service of a number of camps and government work in that section of Virginia. This placed very onerous duties upon him and took all of his time, making it necessary to give up his practice. This entailed considerable financial sacrifice on his part, but he looked upon it as a patriotic duty and unhesitatingly assumed the additional work. After the war and with the change of the federal administration, he retired to his beautiful home, Rosemont, near Berryville, for a well deserved rest. Later he was asked to become executive secretary of the Virginia Tuberculosis Association. This he accepted at a moderate salary because of his devoted interest in the fight against tuberculosis.

At the time of his death he had just returned to his home, after a strenuous trip in the interest of this work. At the annual State meeting of the Elks, upon the suggestion of Dr. Smith, a resolution was passed to construct at one of the State Sanatoria a building for the sick members of their order. Later opposition of certain doctors developed against this plan. This last trip was in the effort to overcome this opposition.

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When the State Board of Health was reorganized in 1908, he was appointed on the board by Governor Swanson, and was the only member of the board to be reappointed by every Governor since then. Upon the death of Dr. Rawley W. Martin, the first president of the Board of Health, Dr. Smith was elected president and has held that office ever since. From the very beginning he has taken a deep and active interest in the work of the board and has practically never missed a meeting except on account of sickness; also he has been ex-officio member of all committees and the steady development of this work has had his personal and interested attention. He has been a large factor in every advance and development made by the State Board of Health.

As a patriotic citizen he has felt it his duty to taken an active part in public affairs. Never running for an elective office himself, he has always worked during election time for the candidate he thought best suited. As a member of the school board of Alexandria and as its chairman, he took an active part in developing the splendid schools of that city, and in seeing that the physical side of the children's development was not overlooked, by insisting on large playgrounds.

He was Past Master of Alexandria Lodge of Ancient Free and Accepted Masons, of which Washington was once Past Master. He was also a member of the Commandery and the Shrine and a member of the Benevolent and Protective Order of Elks.

Few men had so large a number of true and loyal friends. He was always so trustworthy and loyal that he attracted men to him. He never hesitated to sacrifice his means or his health in the interest of his friends or of any cause that he thought was for the interest of the State or the people. He looked upon preventable sickness as an enemy of the people that could be overcome and in his later years, with the self-sacrificing devotion of a crusader, he spent his time and talents in fighting against this enemy. E. G. W.

Dr. Charles Howard Lewis,

Richmond, died at his home in this place, January 3, after a very short illness, his death being due to heart trouble. Dr. Lewis was born in Baltimore, Md., forty-nine years ago. He graduated in medicine from the University of Maryland in 1900 and later took post-graduate work in Baltimore and abroad. About twenty years ago, he located in Richmond, where he had since made his home and practiced. Dr. Lewis was for a time connected with the faculty of the Medical College of Virginia. He had been a member of the Medical Society of Virginia since 1908. Dr. Lewis took an active part in the World War and was a member of the American Legion and also a Mason. He is survived by his wife and two children.

Dr. James Bassett Rawlings,

Of Lawrenceville, Va., died at a Richmond hospital, December 31, at the age of 59 years. Although a native of Brunswick County, Va., Dr. Rawlings had made his home and practiced in Staunton, Va., for many years and his interment was made in that place. Upon completion of his academic education at Randolph-Macon College, Ashland, Va., Dr. Rawlings entered the Medical College of Virginia, from which he received his diploma in 1889. He had been a member of the Medical Society of Virginia since 1890. He is survived by his wife, two children and a sister and brother.

Dr. John William Holmes,

For many years a resident of Pulaski, Va., died December 5th, at Kenova, W. Va. He was a native of Wythe County, Virginia, and seventy-seven years of age. He graduated in medicine from the University of Maryland, Baltimore, in 1882, and had been a member of the Medical Society of Virginia since 1885.

Dr. Henry Rutherford Morrison,

Of Rockbridge Baths, Va., died at a Richmond hospital, November 11, at the age of sixty years. He was a graduate in medicine from the University of Virginia in the class of 1887, and was at one time a member of the Medical Society of Virginia.

Mrs. Julia Langhorne Coleman,

Wife of Dr. Claude C. Coleman, of Richmond, Va., died at a local hospital, January 4, after a short illness. Besides her husband, she is survived by four small children, her mother and a sister, Mrs. J. M. Emmett, of Clifton Forge, Va.

Dr. Romulus Armfield,

Marshville, N. C., died November 23, of chronic nephritis, aged seventy-three years. He was a graduate of the Medical College of Virginia in 1881 and a member of the Medical Society of the State of North Carolina.